Chemical Age

APV

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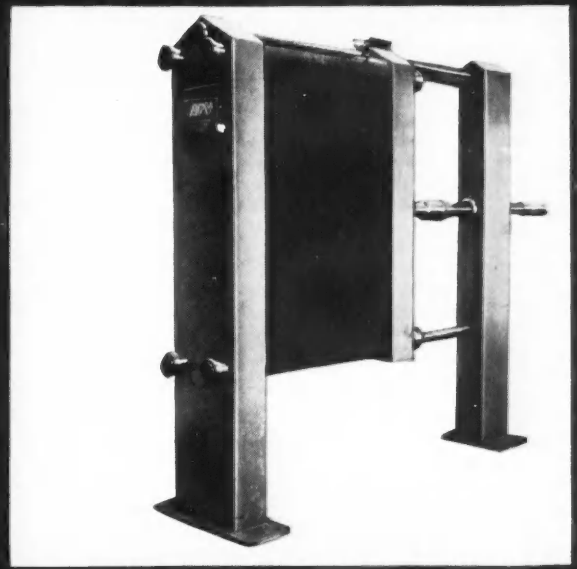

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INDEX TO ADVERTISERS

The first figures refer to advertisements in **Chemical Age Directory & Who's Who,** *the second to the current issue*

(Continued on page 878)

Bet you my Dad's factory uses more acetone than your Dad's.

Bet you it doesn't! My Dad's factory
uses simply tons and tons and tons of acetone.
And it all comes from Shell Chemical, so there!

Golly! My Dad's acetone comes from Shell, too.
I say . . . like a bullseye?

SHELL CHEMICAL COMPANY LIMITED

In association with Petrochemicals Limited and Styrene Products Limited

REGIONAL OFFICES;

SOUTHERN	Villiers House, 41-47, Strand, London, W.C.2. Tel: Trafalgar 1277
MIDLAND	Warwick Chambers, 14-20, Corporation Street, Birmingham, 2. Tel: Midland 6954
NORTHERN	144-146, Deansgate, Manchester, 3. Tel: Deansgate 2411
SCOTTISH	Royal London House, 48-54, West Nile Street, Glasgow, C.1. Tel: City 3391
IRISH	16-20, Rosemary Street, Belfast, Northern Ireland. Tel: Belfast 26094
	33-34, Westmoreland Street, Dublin. Republic of Ireland. Tel: Dublin 72114

S.A.3 *A set of these advertisements is available free on request from any of the offices listed above.*

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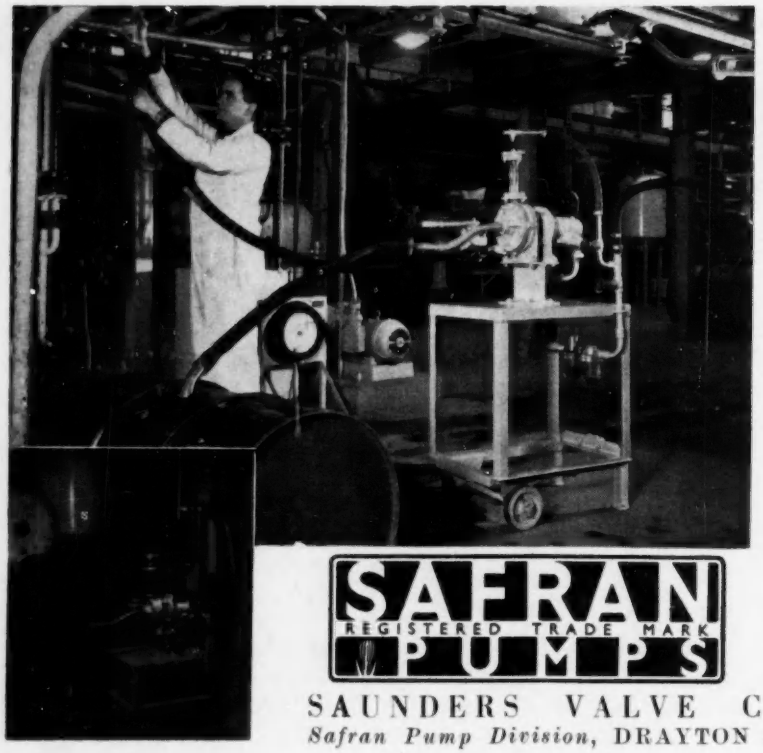
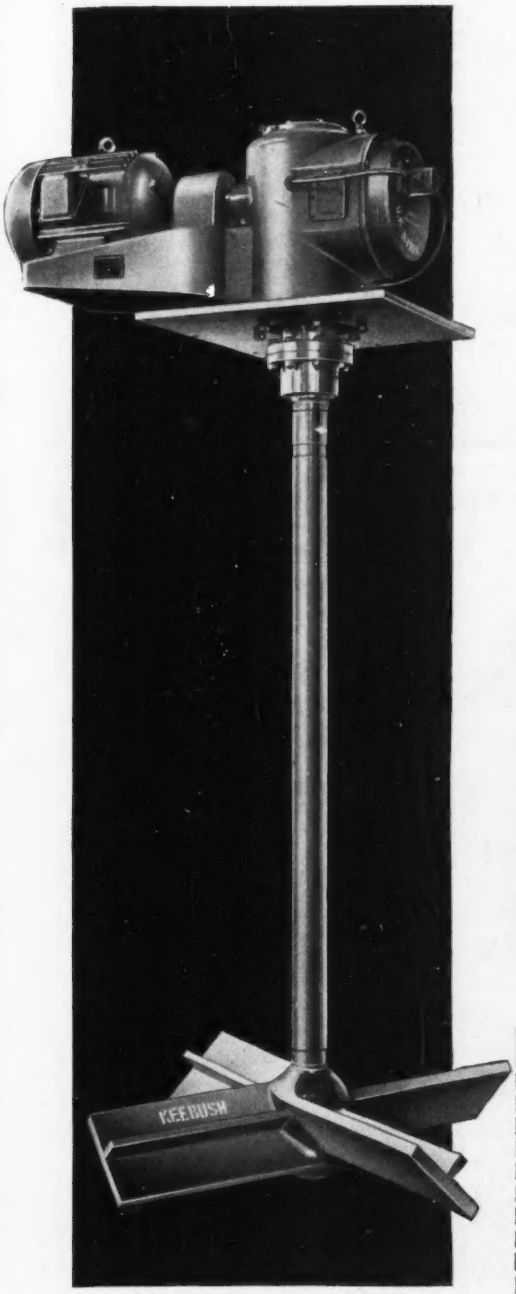


STOCKDALE ENGINEERING LIMITED

CHEMICAL ENGINEERING News

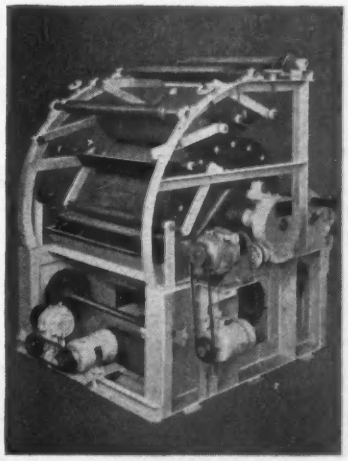
POYNTON CHESHIRE No. 11

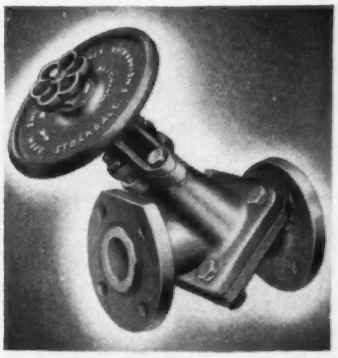
MATERIALS SELECTION AND APPLICATION



The design of equipment for use in corrosive or erosive conditions calls for a sound knowledge of the constructional materials involved. Stockdale Engineering Ltd., have gained this knowledge by long experience in the design and manufacture of chemical plant involving the widest range of materials. They have successfully developed a variety of equipment, including filters, agitators and valves, in addition to complete plants for applications ranging from Chlorine Liquefaction to Optical Abrasive production and the manufacture of Phosphoric Acid. Attention to design detail - a vital factor - is illustrated by the units shown here.

The agitator (left) is provided with a stuffing box in the lower half coupling to maintain seal between coating and inner shaft accommodating differential expansion. The rubber covered filter (right) is fitted with a caulking system which eliminates the possibility of damage to the ebonite during cloth fixing.





Stockdale's range of Y valves in the Stelcalloy series of high nickel alloys and the Stockdale Patent Pinch Valves with natural or synthetic rubber sleeves, are helping many plant engineers to overcome difficult corrosion and abrasion problems.

SEND FOR INFORMATION ON:

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- Valves ... ... [ ]
- Rubber and lead lining [ ]
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Please tick as required

STOCKDALE ENGINEERING LTD., POYNTON, CHESHIRE. *Tel. Poynton 2601*

Name .....

Company .....

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Address .....

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Position G.11

SC99

VOL. 82 No. 2110
DECEMBER 19 1959

Telephone: **FLEet Street 3212** *(26 lines)*
Telegrams: **Allangas - Fleet - London**

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Manager R. C. BENNETT
Director N. B. LIVINGSTONE WALLACE

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IN THIS ISSUE

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CHEMICAL AGE

BOUVERIE HOUSE · 154 FLEET STREET · LONDON · EC4

CHEMICALS AND F.T.A.

THE prospect of Europe being split into two competing trade blocs is one that few British chemical manufacturers can view with equanimity. In fact the industry only gave its support for the new European free trade association of the 'outer seven' in the hope that it would lead to a closer association with the 'six' Common Market countries.

In her high tariff sectors (synthetic organic chemicals and scientific instruments, where the U.K. rates are generally either 33⅓ or 50% compared with less than 20% for the C.M. area) Britain does not obtain a large proportion of imports from non-O.E.E.C. sources, so that whether or not there is to be free trade throughout Europe is of more direct concern to U.K. industry than the level of the U.K. tariff against non-European countries.

Under the 'outer seven' arrangements, the countries will initially cut their tariffs by 20% which will entail a much smaller reduction from the 5% rates of Austria, Norway, Portugal, Sweden and Switzerland than the U.K. rate of 33⅓%.

This association is therefore not likely to lead to much expansion on the part of U.K. chemical exports, but could mean more imports from our partners in the F.T.A.

This 20% cut of the 'seven' is due to be made on 1 July 1960, while on the same date the 'six' will make their second 10% cut in their intra-country tariff rates. In arriving at the future common tariff of C.M. common tariff, the German and Benelux duties are to be raised appreciably; previously it had been these low tariff areas of the C.M. that have provided the best markets for exports by the F.T.A. to the 'six.' In general the C.M. will provide bigger advantages for its exporters of manufactures than the rest of the F.T.A. provides for the U.K.

Interest currently centres on the outstanding items in industrial basic materials, List G, where tariff rates have yet to be fixed by the C.M. Items yet to be negotiated include sulphur, lead and zinc and it appears that C.M. working parties think that the problems raised by the creation of the Common Market should be dealt with by means other than high tariff protection. If the C.M. were to adopt a broadly low-tariff settlement of these materials, it would go some way to eliminate the difficulties caused by Britain's obligation to maintain free entry for the bulk of imports from the Commonwealth that arose in the original free trade negotiations.

It is probable that some time in 1960, possibly when both areas are due to make tariff cuts, attempts will be made to reopen negotiations with the C.M. countries with a view to bringing together the two trading areas. If that is the case, then tariff disparities are likely to be a central issue.

The likelihood of Europe drifting into two separate and permanent trade blocs might well provide the incentive necessary to bring these discussions to a successful conclusion. In any event, Britain's official negotiators should have a greater sense of urgency than was apparent at the earlier discussions on a wider free trade area.

Much useful information on trade and tariffs necessary for an analysis of the problems involved in linking together the customs union of the six Common Market countries and the free trade area of the 'outer seven' is

given in a new book entitled 'Tariffs and Trade in Western Europe,' (George Allen and Unwin, pp. 136, price 30s) Political and Economic Planning (P.E.P.). The report's 113 pages of tables on tariffs and trade give some indication of the probable contribution the removal of barriers can make to the expansion of trade and of the changes in trading patterns that may occur if no means is found of bringing the two groups together. Twelve of the pages of tables are devoted to organic and inorganic chemicals and they show the tariff rates now operating in the main countries of Europe together with the C.M. rate, and tables relating to the origin of U.K. imports.

U.S. CONSTRUCTION WORRIES

BUSINESS conditions in the U.S. in the chemical industry are reported as not being as hopeful as earlier prophesies suggested. Plant expansions are being delayed —in many cases because of doubts created by the steel strike, although there are some who put the blame on curtailment of long-term expansion plans by the chemical industry. Overcapacity on the whole has been eliminated and it seems likely that the U.S. tendency to "get on the bandwagon" is dying in the chemical industry. In the future it is expected that new plants and expansions will only go up after careful planning and thought to profitable capacities, etc.

Construction companies in the U.S. are reporting that it is definitely a money market these days, and quite a different attitude exists compared with the lavish spending of the last five or six years. Holding this view are Chemical Construction Co. (Chemico) and Blaw-Knox. Plant projects still of interest, according to Blaw-Knox, are those for polystyrene, vinyl and soluble proteins.

Bleak prospects are also foreseen by Dorr-Oliver Inc. Chemical plant expansions, with the exception of fertilisers, pulp and paper are regarded by them as good. This company sees more and brighter prospects overseas, with much more foreign construction. It will be recalled that British chemical construction plant manufacturers have recently been expressing concern about prospects, especially for those with few processes to offer (CHEMICAL AGE, 7 November, p. 641). U.S. construction companies have in general had hard times for the past couple of years but they had expected better prospects in 1960. Competition now, however, is strong and is expected to continue in the coming year.

Steps being taken by the large U.S. construction concerns are interesting. Blaw-Knox are tending to change over to the food processing industry as they feel that this will prove more profitable than chemical industry. More hopeful are M. W. Kellogg who hope to improve their chemical plant construction section through co-operative research, along the same lines as they have already done with the petroleum industry. Plant construction costs, they believe, can be reduced by 50%, if this were done. Receiving special attention are the smaller chemical companies which lack the larger chemical manufacturers' facilities.

NEWER-METALS MARKET

ENTERING the newer metals field commercially is something of a hazard. Produced at great expense, after overcoming processing and handling difficulties, applications giving the impetus to the production of the metals in the first place may be stillborn or much reduced at an early date, leaving costly plant or large idle capacity on the manufacturers' hands.

Some months ago it seemed as if this would be the case with titanium. Even I.C.I. Metals Division's chairman-designate, Mr. M. J. S. Clapham, admits that titanium sales are not nearly as large as I.C.I. had hoped they would be. Interest in the use of titanium for chemical engineering purposes and for chemical plant appears to have relieved the situation somewhat as has the greater usage of titanium in aircraft components. I.C.I. say that they are now satisfied with the rate of growth of this metal, although undoubtedly they have been disappointed that titanium did not get the 'shot in the arm' they expected from the Government from U.K. defence requirements. Clapham reports that titanium is now making a profit and that further increases of the capacity in use can be expected.

Present experimental use of titanium for 'con rods' for sports cars is seen as likely to lead to greater usage of the metal for this purpose in cars generally.

Zirconium and beryllium, two more of the newer metals, are at present being produced to fulfil nuclear engineering requirements. I.C.I. are now selling zirconium in Europe for nuclear reactor construction, particularly in the Scandinavian countries, and the company reports that a nice market is growing up for zirconium foil for flash bulbs.

Beryllium, at present used for fuel cans and ancillary nuclear reactor equipment, is potentially interesting to the aircraft industry because of its low density and high elastic modulus. Technical and economic obstacles associated with beryllium are slowly being overcome, and there now seems to be more hope regarding improvement of this metal's ductility. Work by I.C.I. Metals Division's research department on this particular problem looks like leading to production of beryllium with good ductility in the near future, according to senior I.C.I. spokesmen. Unfortunately because of its scarcity in the raw material state, beryllium is always likely to be an expensive metal.

Also under intensive study at I.C.I. Witton are niobium, vanadium, hafnium and molybdenum. Niobium, in particular, appears to have considerable potentialities. In the U.S. Nb alloys are reported to have been developed with excellent oxidation resistance up to 1,230°C. Simple wrought forms such as rod, sheet and tube are now being made in I.C.I.'s research section from arc-melted material. Good progress has also been made in the development of arc-melting and fabrication techniques for hafnium.

The other U.K. producer of the newer metals, Murex Ltd., have a tantalum/niobium plant in operation at Rainham (CHEMICAL AGE, this issue, p. 897). They are supplying tantalum metal in the form of rod, sheet, foil, wire and tube, and niobium is available in fabrication forms. Zirconium metal is being produced by Murex as ingot, rod, wire, bar sheet, tube and sponge.

BERYL ORE FLOTATION PROCESS

CURRENTLY all beryl has to be handpicked from host rock by a process known as cobbing. Hence a commercial flotation process would have notable economic aspects and according to some U.S. authorities would cut the price of beryl ore, now priced at $340-$530/ton, and so open new markets to the metal. Low grade U.S. beryl reserves could also be used to insure adequate domestic supply and remove the scarcity label now present.

U.S. Dynanamic Metal have announced that they have found the means of making flotation separation of beryl ore possible on a commercial scale and this must be welcomed by the beryllium industry; The Bureau of Mines, at the Salt Lake City laboratory, also report that they have discovered a combination of materials that may lead to another beryl ore flotation process. The bureau state that by preparing the ore surface with hydrofluoric acid or petroleum sulphonate, or sodium chloride with sulphuric acid, beryl ore can be made to float free of most material with such fatty acids as linoleic or oleic.

Contract News

12 Contractors Asked to Bid for Refinery

● MR. PAUL GETTY'S Tidewater Oil Co. recently made history when it got representatives of 12 different contracting companies round the same table and called on them to submit fixed price bids for an oil refinery to be built in Denmark. Six of the contractors have backed out. Bids must be submitted within the next two or three weeks.

● A CONTRACT valued at more than £10,000 has been awarded to William Boby and Co. Ltd., Herts, to supply two complete de-alkalisation base-exchange plants for the Hull Fish Meal and Oil Co.

● BIRWELCO LTD., Aston, Birmingham, have been awarded a contract to supply seven Petro-Chem Iso-flow furnaces for the new Esso Refinery at Milford Haven. The order is worth more than £300,000. One of the furnaces is for the hydrofiner train and is of the all-radiant type. The duty is about 55 million BTU/hr. The other six furnaces are for the powerformer unit and have a total duty in excess of 300 million BTU per hour. The largest furnace, operating with a duty of over 110 million BTU per hour, is a radiant separate convection unit to give an efficiency of about 70%.

● Two contracts worth together about £250,000 have been won by Sharples Process Engineers Ltd., 62 Brook Street, London W.1., for supply of complete vegetable-oil refining plants for Rumania, incorporating the Sharples 'no-loss' process. The plants are expected to be on stream by the end of next year.

T.I. to Supply Beryllium Know-how to U.S.

UNDER a 'know-how' agreement, the Chesterfield Tube Co., a Tube Investments Co., will supply the techniques of beryllium tube drawing and finishing developed by Chesterfield and the T.I. Research and Development Division, to the Superior Tube Co., Norristown, U.S. The future beryllium research programmes of the two companies will be co-ordinated with a full exchange of technical information.

Chesterfield Tube are said to lead the world in the production of precision tubes in beryllium.

Big Rise in Use of Air Freight for Chemicals

The value of U.K. chemicals exported by air during the first half of this year totalled £4.1 million f.o.b., or 2% of the total U.K. freight shipments for the period. This compares with a July-December 1958 total of £2.7 million f.o.b. (2% of total) and a January-June 1958 figure of £2.9 million (2% of total).

In Parliament

Debate Sought on British Oxygen Co.'s Prices and Profits

NOTICE to call an adjournment debate on prices and profits of the British Oxygen Co. was given by Miss J. Lee in the House of Commons last week. She had asked Mr. F. J. Erroll, the Minister of State, B.o.T., what steps he had taken to see that undertakings given by the company in March 1958 in regard to prices and level of profits had been carried out.

Mr. Erroll replied that no undertaking was sought or given regarding prices and profits. The company had fulfilled its undertakings to publish price scales and to charge customers, without discrimination, on the basis of those scales. Mr. Erroll added "We think that those are the two most important matters mentioned in the Monopoly Commission's report on the company. The company had made no general increase in its prices for oxygen and acetylene since 1957 and we consider that the agreement which we obtained from the company is satisfactory".

Delay in Patents Applications

Delays in the printing of specifications and in the making of blocks were given as the cause of the prolonged periods which currently pass between ascertainment that a patent application is in order, and its acceptance.

This was stated by Mr. R. Maudling, President, Board of Trade, in response to a question of the subject. He added that steps were being taken to increase the rate of printing and that an improvement was expected. He explained that the period between the expiry of the opposition period when the patent application was unopposed and the grant of the patent was three weeks, a period which had not changed in many years and was not thought to have caused inconvenience.

U.K. Agricultural Sprays are not Carcinogenic

No toxic sprays have been condemned in this country as carcinogenic, and those identified as such in the U.S. have not found their way on the British market, stated Mr. D. Walker-Smith, Minister of Health, in response to a recent question in the House of Commons.

A further question relating to the subject was posed when the Minister of Agriculture, Fisheries and Food, Mr. John Hare, was asked to name the "small group of scientists who were to examine the use made of toxic sprays in agriculture, and what their terms of reference would be".

In a written reply the Minister stated that the composition of this group was still under consideration, but that it will probably consist of "about eight scientists" comprising, among others, the chief scientific advisers to the Government on agriculture and food. Other bodies mentioned as nominators of scientists to the group were: Plant Pathology Laboratory, Medical Research Council, Agricultural Research Council, Department of Scientific and Industrial Research and Nature Conservancy.

Microbiological Research and Chemical Warfare

Since the work of the Porton Microbiological Research Station is not allied exclusively to any Government Department its administrative links with the Chemical Defence Experimental Establishment, for which the War Office is responsible, will be preserved, stated Mr. Macmillan, in response to a question in the House recently.

In answer to a further question the Prime Minister went on to say: "Our position is perfectly clear towards both chemical and bacteriological weapons. We are pledged not to use them except in retaliation, but I remember, for instance, that in the Second World War it was necessary for us to prepare methods of retaliation in chemical warfare, and perhaps the fact that we were known to have prepared them had some effect on their not being used."

Chemical Age Wishes a Happy Christmas to all its Readers

£1-million Extension to I.C.I. Solvents Plants

EXTENSIONS now planned by the Imperial Chemical Industries Ltd. to their trichloroethylene and perchloroethylene plants at Castner-Kellner Works, Runcorn, will increase the firm's combined capacity for these two solvents by 25%. They will also enable the I.C.I. to satisfy demands of the home market for several years ahead and permit a further increase in their present export trade.

The extensions, which are to be carried out by I.C.I.'s own engineers, will be based on "a new manufacturing process" expected to lead to reduced production costs, and will be completed in 1961.

Revised prices carrying 'initial reductions' of £1 10s for trichloroethylene and £5 per ton for perchloroethylene are being introduced on 1 January, bringing the respective prices of the solvents down to £70 15s and £83.

★ An intriguing position has arisen over patents for synthetic diamonds and it looks as though the monopoly that De Beers have enjoyed on natural diamonds will extend to synthetic stones. Although General Electric of the U.S. have produced synthetic industrial diamonds for some time, the military secrecy imposed on the company has prevented publication of process details and prevented General Electric from patenting their process.

But De Beers have filed patent applications in virtually every western country, including the U.S. If these patents are granted, De Beers may well occupy much the same position in synthetic stones as they already do in natural diamonds, via the Diamond Corporation. With the 'key' to the synthesis of industrial stones in their hands, the traditional fears that De Beers could be vulnerable to competition from man-made stones would no longer exist.

★ The U.S. antitrust indictment against Merck, Eli Lilly, Wyeth, Parke Davis and Pitman Moore on the grounds that they were conspiring to fix the price of Salk polio vaccine has been rejected by the Federal District Court in New Jersey. This might prove a hollow victory, for Senator Kefauver is investigating the administered pricing of drugs. First under attack are steroids, to be followed by antibiotics and vitamins.

The Senate Antitrust Subcommittee in Washington has been told that Schering Corporation, Bloomfield, New Jersey, brought a certain medicine for 11.7 cents (about 9d) a batch and resold it to chemists at $8.40 (about £3), an estimated profit of more than 7,000%. It is also said that Schering made a profit of more than 2,700% on another product.

Schering's president, Mr. Francis Brown, has told the subcommittee that the testimony that the company made over 7,000% profit was 'severely damaging and most unfair.' The company, he added, had a profit of about 12.5% on a particular drug and that documents used by the subcommittee 'grossly misconstrued the true facts.' Not taken into consideration were expenses in administrative charges, taxes, distribution costs, royalty payments and in selling the drugs.

★ The recent inquiry in the chemical industry by the Association of British Chemical Manufacturers disclosed the need for more information on distillation, and the international symposium at Brighton next May should provide valuable information needed to fill the gap.

The preliminary programme awaiting this meeting of the European Federation of Chemical Engineering contains 29 papers from distillation experts in nine countries — papers which have been selected as the most apposite from among the many proffered by the Institution of Chemical Engineers and the Chemical Engineering Group of the Society of Chemical Industry, who are jointly sponsoring the arrangements.

To be conducted in English, French and German, with simultaneous translations, the meeting should be among the outstanding chemical industry events in the 1960 calendar. Full particulars are available from Dr. J. B. Brennan, general secretary I.Chem.E., 16 Belgrave Square, London S.W.1.

★ Introduction last week by Doulton Fine China Ltd. of their new range of translucent felspathic pottery led me to ask Mr. J. K. Warrington, managing director, if the process was based on the use of boron phosphate (BPO_4). The company, however, are not willing to reveal any technical details concerning the base materials used beyond saying that 'it is a new material' and that it is not boron phosphate.

Boron phosphate has been used in recent research work both in France and the U.S. With a chemical analysis of boric oxide (B_2O_3), 32.91%, and phosphorus pentoxide (P_2O_5), 67.09%, boron phosphate is used in ceramics in prefused mixtures with felspathic materials, when it acts as a powerful flux and enables the production, without bone ash, of high-translucency phosphatic porcelain-type bodies at firing temperatures some 200°C lower than usual. Lower temperature maturing and vitrification is also possible when boron phosphate is used as an ingredient in electrical porcelain, raw glazes and vitreous enamels.

This use of boron phosphate, together with its uses in glass and as a catalyst, is the subject of a new technical data sheet from Borax Consolidated Ltd. This company also has available English translations of a paper by M. C. Blin of the Soc. Francaise de Céramique, describing use of the chemical in producing high-translucent porcelain. Their development department can give further information on properties and uses.

★ Faced with problems in hiring guards for their Linden plant, General Aniline and Film Corp. a year ago decided to hire students from nearby Rutgers University and other colleges in the neighbourhood. The students provide security 24 hours a day and so successful has the idea proved that some believe it could develop into a national trend in the U.S.

The 28 students involved work an average of 26 hours a week depending on their college schedules. Night students are on guard during daylight hours and day students during the evening hours. Guard assignments are rotated so that each student gets several hours of study.

Cost to G.A.F. is about $78,000 a year including wages and uniforms plus minor benefits such as hospitalisation; students' pay is $1.50 an hour. Most of the student guards are science majors, so G.A.F. can do some "back door" recruiting of chemists and engineers. Students also get a good picture of life at G.A.F. and can decide if they would like to work for the company after graduation.

★ It seems that chemists are keen on versifying and the recent series of competitions organised by the *M. and B. Laboratory Bulletin* have been singularly successful. The latest, to be set by 'Phulax' of May and Baker Ltd. gives chemists another chance to exercise their poetic ability. Competitors are asked to give advice to scientists in the style of Kipling's 'If'. Two stanzas only are required and should be submitted to the competition editor of the bulletin by 29 February.

In the previous competition in which clerihews on famous scientists were sought, first prize of £5 5s went to Professor C. W. Davies, who holds the chair in chemistry at Aberystwyth. He said parenthetically:

C. W. Davies
Thinks that gravy's
Full of vitamins and vim
Unlike his singular patronym.

One of his winning clerihews was:

Robert Boyle
Has shuffled off this mortal coil.
Compressing air in a receptacle
Seems to have made Sir Robert
sceptical.

I cannot resist perperating the following irrelevancy:

Sir Alex. Fleck
Gets I.C.I.'s biggest cheque
Till in March the economic flank
Takes up chambers on Millbank.

★ Should companies send Christmas cards? There has been much debate on that point this year, and while some companies have stopped the practice others in the chemical field have started it. I learn from Sir Miles Thomas, chairman of Monsanto Chemicals, that the company has joined "the growing number of firms which do not send out a company Christmas card". Sir Miles adds that Monsanto will instead make a donation to charity.

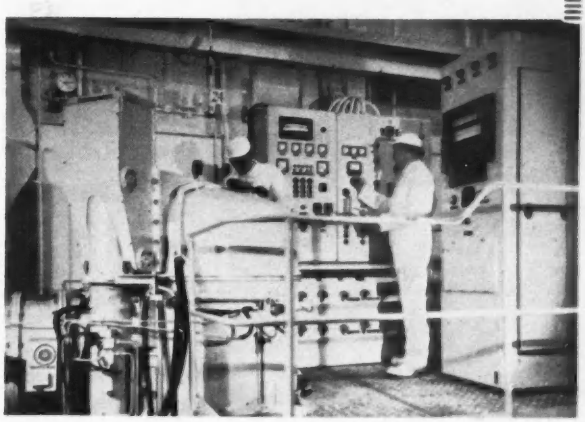
Whessoe of Darlington, one of the first firms to introduce the company card, are to stop the practice because they have exhausted the supply of historic views and reproductions of old prints of Darlington—a feature of their cards.

Whatever my readers or their firms do in the way of sending out Christmas greetings, I hope they will accept my best wishes for the festive season and forget for a few days their chemistry cares, patent problems and process posers.

Alembic

I.C.I. BERYLLIUM PLANT NOW OPERATING

Part of £10.5 Million Spending on Development of New Metals



Beryllium powder, produced by reducing the cast ingot, is consolidated in a sintering furnace before extrusion at Kynoch Works

NOW commissioned as part of Imperial Chemical Industries £10.5 million development of new metals and alloys is their £1 million wrought beryllium plant at Kynoch Works, Witton, site of the company's Metals Division. The plant, which is the first in Europe, has been completed in about a year and has a capacity of between seven and 10 tons annually of products costing £160 a pound. Some 200 people are employed on shift working—two shifts at present, although there will shortly be a third.

Main outlet for beryllium to date has been for reflectors in atomic reactors with small quantities used in X-ray windows. The experimental Advanced Gas-Cooled Reactor now being built for the U.K. Atomic Energy Authority, however, will not only use beryllium for fuel cans but also for ancillary reactor equipment. The metal is also of potential interest to aircraft engineers because of its combination of low density and high elastic modulus; there are indications that beryllium has already been used in the U.S. for components in high-speed aircraft, guided missiles and guidance systems. The U.S. space capsule, it is known, will use beryllium to protect man on his re-entry into the earth's atmosphere.

Considerable Obstacles

Technical and economic obstacles are considerable with regard to large-scale utilisation. Because the raw material, beryl, is comparatively scarce (main producer is Brazil, followed by Rhodesia, South Africa and India) and elaborate techniques are involved at all stages of production, beryllium is inevitably an expensive metal. Raw beryllium costs about £17-20/lb. and the world price for the wrought metal is about £160/lb.

Metallic beryllium is separated by a three-stage extraction process; the ore is converted into beryllium hydroxide, and this in turn into beryllium fluoride or beryllium chloride. Pure metal is extracted either by reacting the fluoride with magnesium, which produces 'pebbles' or by electrolysis of a mixture of beryllium and sodium chloride, which yields 'flake'. I.C.I. use as their material imported flake and pebble beryllium obtained through the A.E.A. from Pechiney of France.

The Beryllium Plant. All the recommendations on the safe processing of beryllium based on U.K.A.E.A. and U.S. experience are incorporated in the plant. It is a single-storey building, broadly divided into contact areas, where beryllium is handled, and non-contact areas free of beryllium. Production area, laboratories and ventilation bay, all contact areas, are designed to simplify dust control. There are no windows and incoming air, filtered and heated is changed every three minutes and extracted through machine enclosures, glove boxes used for handling the metal and special ducts. About 200 tons of air are moved every hour and are passed through absolute filters before being discharged from a 150 ft. high chimney. All personnel in the contact area wear protective clothing.

A negative pressure created inside the building by the ventilation system ensures that all contact air follows the prescribed route through the exhaust filters. The filter bay contains 13 banks each of eight Vokes HT55 air filters. Flat ledges have been kept to a minimum and, to facilitate cleaning, floors are curved to the walls and all surfaces are smooth and painted.

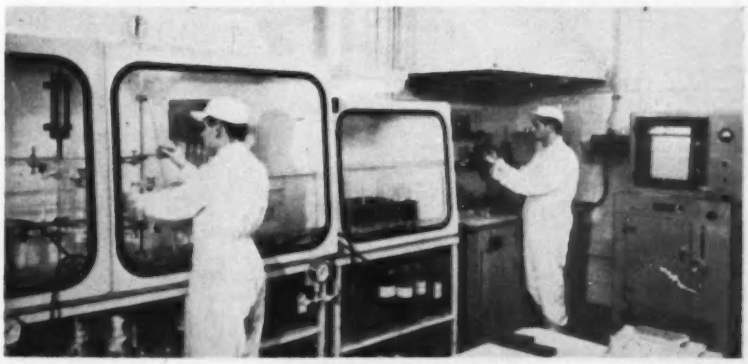
The building is entered through the amenities area, which comprises reception, changing rooms, clothing store and toilet facilities. Personnel are supplied with a complete set of clean clothing at the beginning of each shift and shower on leaving the contact area.

Unlike most finely divided powders beryllium is not pyrophoric but as a fire in the plant might cause interference with dust control routines the use of wood has been completely avoided; all doors, door frames, chairs, tables, etc., are made of steel.

In addition to all the above mentioned precautions, every week 3,000 air samples are taken for analysis to the research department using Lansom tube to ensure that the presence of beryllium does not exceed 0.01 microgrammes/100 c.m./air.

Processing Beryllium. Essential preliminary is refining in a vacuum induction melting furnace, since properties of the wrought metal are adversely affected by impurities present in the beryllium flake. Also to produce metal with superior mechanical properties, particularly in regard to ductility, powder metallurgy techniques have to be employed. The cast ingots is therefore machined to swarf, which in turn is ground to fine powder. This powder is then packed into graphite moulds and sintered at high temperature under vacuum. Solid compacts produced in this way are either machined to finished size or prepared for further processing. Rod and tube are produced by extrusion, particular care being taken to avoid seizing in the dies. This is achieved by plating (e.g. with silver) the extrusion slug or enclosing it in a protective mild steel sheath.

Air contamination is kept within the



Control laboratory of the I.C.I. beryllium plant where high purity of both raw material and metal is ensured during processing by frequent analysis and radiography

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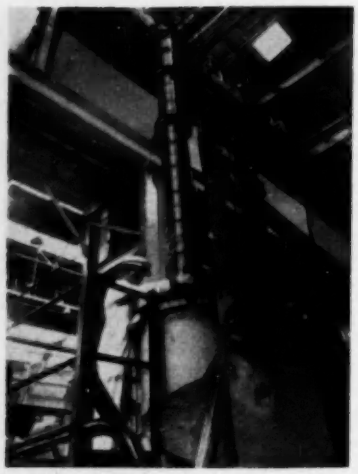


Loading a 2,100 lb. titanium consumable electrode into crucible before melting

prescribed limit by careful design of equipment handling powdered beryllium. Suction pipes working with a velocity of 10,000 ft. per minute are provided immediately adjacent to cutting tools or other points of dust generation, and all machining operations are performed inside glove boxes from which air is automatically withdrawn.

Quality of the beryllium is controlled throughout all stages of processing. In the control laboratory in the plant spectrographic determination is used to determine aluminium, magnesium and calcium. A solution technique is used the solution being held in a polythene cup. A photodensitometer is used to measure intensity of impurity and X-ray analysis detects any flaws in the metal. Carbon and oxygen determinations are carried out, that for oxygen being determined by vacuum fusion. An absorptiometer is used for colorimetric determination of iron, nickel and silicon.

In a special finishing area, material, such as beryllium tube, is cut to length, straightened, annealed where necessary, inspected using I.C.I. Metal Division's newly developed 'Introview', which detects irregularities in the tube bore, etc., and records these on a paper strip.

Titanium Production. First venture in the newer metals field for I.C.I. was the establishment of a titanium plant, which came into production in 1951. With a capacity of 12 tons a year, it used the Kroll process. Three years later, this plant was replaced by a 100-ton capacity plant still using the magnesium reduction process. General Chemicals Division of I.C.I., developed in the meantime a better and cheaper method based on reduction with sodium. By 1953, enough evidence was available to warrant the design of a full-scale reduction plant, which was commissioned at I.C.I.'s Wilton Works, near Middlesbrough, in 1955. Its job was to produce 1,500 tons a year of raw metallic titanium.

Three large furnaces at Wilton are now producing 2,000 tons a year of high purity titanium (99.7%) in ingots weighing 2,100 lb. or 4,200 lb. compared with ingots of 400 lb. using 18 furnaces for an output of 1,500 tons a year. The furnaces employed, the largest and most up to date in Europe, were built in Western Germany and delivered to Wilton early in 1958. As titanium melting is subject to hazards not encountered with more conventional methods, all operations are carried out by remote control. Each furnace is built inside a massive 60-ft. high reinforced concrete cubicle, and before melting starts this is sealed by closing and locking a 10-ton door.

A consumable titanium electrode is melted to form the ingot. This electrode is made from granules of raw metallic titanium, sometimes mixed with other powdered metals to make alloys. After double mixing (using a barrel mixer and a 'splitting charge' table) to ensure thorough blending, a measured charge is fed into the die of a 2,500-ton press, which compacts the powder into a semi-cylindrical briquette (weight about 80 lb.). Briquettes are then spot-welded together and the welds reinforced with screw titanium plate to make an electrode 12 ft. long and weighing almost a ton.

Complete Homogeneity

The electrode is suspended from the top of the furnace while the water-cooled copper crucible is clamped on at the bottom. The furnace is evacuated, arc is struck on to a small quantity of titanium powder in the crucible base and the whole electrode is slowly melted to form an ingot. To ensure complete homogeneity, the process is repeated. The ingot is raised to the top of the furnace, the crucible changed, and the ingot re-melted into a larger diameter crucible.

The process of melting is watched by operators sitting in a twilight control balcony by means of an optical system (using mirrors) which projects an image of the arc zone on to twin screens (another advantage of this system is that the images formed are in colour). Electrical and electronic devices supply continuous data on the operation of the furnace and ancillary equipment throughout the four or five hours needed to produce a 1-ton or 2-ton double-melted ingot. Once titanium is consolidated into ingot form conventional metal-working techniques are applied, attention being paid, however, to titanium's inherent characteristics, such as oxidation behaviour, low rate of work hardening and tendency to gall on sliding contacts.

After ultrasonic testing to check for freedom from flaws, the ingot passes to the forge for forming into flat stop or round billet. Heated in an electric furnace, the ingot is forged into shape by forging press or hammer. At this stage, most of the titanium produced at Wilton goes to I.C.I.'s fabricating plant of Waunarlwydd, South Wales, for processing into rod, sheet and tube, etc.

Present Titanium Position. Although the expected demand from the aircraft industry has not occurred because of changes in the defence programme more titanium is being used in each aircraft. Joint managing director and chairman-designate of Metals Division, Mr. M. J. S. Clapham, at the press visit to the plant last week, said that demand in relation to the proportion of titanium used in end-products was growing at about the rate expected. Increasing uses are being found for the metal in chemical plant, condenser tube and marine work, where its anti-corrosion properties are attractive.

Among new alloys is titanium 679, an aluminium-tin complex which is beginning to break into the turbine disc field. Platinised titanised anodes are now in use in electrolytic cells for chemical manufacture (NaOH—Cl.), and for cathodic protection of chemical plant and marine structures.

The titanium plant is currently working at about 25% capacity, compared with a peak of 40%, it is stated.

I.C.I.'s third new metal being produced in various forms for nuclear engineering, including fuel sheathing and structural components for nuclear submarines, is zirconium. Outside nuclear engineering zirconium at present has applications as lining for vessels, pump and valve components, agitators thermocouple pockets and other items of chemical plant. More recently the use of zirconium foil, or flattened fine gauge wire, for photographic flash bulbs has been introduced.

Research Department's Activities. Employing some 300 people and with an annual budget of £500,000 the research department serves all the factories of I.C.I. Metals Division, supporting production departments and longer-term research. In the analytical section, means for determining the composition of reactor grade zirconium alloys are devised, and analyses of air samples from the beryllium plant are carried out.

Evaluation Buttons

In the new metals laboratory, small evaluation buttons are produced for examination. Apparatus includes melting, homogenising and vacuum quenching furnaces and equipment for studying fundamental structural changes in metals. Consumable and non-consumable electrode vacuum furnaces produce consolidated material in the arc melting laboratory as 100-gramme buttons and as ingots of 5 to 300 lb. In the casting shop the objective is to improve casting techniques for both established and new metals. A small vacuum arc melting furnace and a large vacuum induction unit are both capable of operating under very high vacuum (10^{-5} mm. Hg.). The corrosion section undertakes long-term research into corrosion behaviour of metals, the welding section studies both conventional and novel jointing techniques, and a metal deformation section is concerned with basic studies and prototype rolled, drawn and deep-drawn products. Particular attention is being paid in this last section to methods of producing nuclear fuel cans.

Lastly a creep test station operates as a centralised service for all I.C.I. divisions being equipped to assess creep properties of both ferrous and non-ferrous metals. Some stress-to-rupture machines are adapted for testing under vacuum.

Now undergoing evaluation in the research department for commercial applications are hafnium, niobium, vanadium, tantalum and special alloys.

Chemical Engineering Aspects at the Niobium and Tantalum Plant of Murex

OCCUPYING an area of nearly a 100 acres on the River Thames at Rainham, are the works of Murex Ltd., where the manufacture of metallurgical, chemical and engineering products is carried out. This siting of the works permits the company to deal at their own wharves and jetties with the many thousands of tons of incoming raw materials and outgoing products which are handled each year, while excellent road facilities enable rapid delivery of goods.

Murex have played a specialised part in the alloy field by supplying the rare metals needed in a form and at a price which allows commercial development of these discoveries. In the last few years in particular, Murex have made available in commercial quantities, tantalum and zirconium and, more recently, niobium.

Because of the growing interest and demand in tantalum and niobium, Murex designed and set up a new tantalum/niobium plant at Rainham at a cost of around £400,000. As has been noted recently (CHEMICAL AGE, 3 October, p. 443) in this new plant, production is handled from the raw materials stage to the drying of pure crystals of potassium tantalum fluoride, and crude potassium niobium oxyfluoride. Reduction, leaching and drying facilities for the preparation of tantalum metal powder have been in operation since October and in early 1960 a new process line will be in operation in the new building for large-scale production of niobium oxide and metal of high purity.

New Construction Materials

Such a plant as Murex have designed would not have been possible even 10 years ago because of problems concerned with choice of suitable construction materials. Raw materials required in the processing of tantalum/niobium include concentrated sulphuric, hydrochloric nitric and hydrofluoric acids, which are required for use singly or in combination and sometimes have to be handled at high temperatures.

Murex employ polythene (standard and type 740) as lining material for vessels, for ducting and tanks, rigid p.v.c. for ducting, Resilon for storage vats, graphite for lining vessels. Because of the large amount of fabrication vessels required for individual plant, Murex maintain their own works for producing polythene tanks, linings, etc. Vessels for dissolving the tantalum/niobium compound in hydrofluoric acid/nitric acid mixture prior to liquid/liquid extraction are of mild steel lined with carbon black. At the base of each vessel is a polythene catch tray in case the lining is damaged and the acid material eats through the mild steel outer. The retractable stirrer employed is of carbon.

After solution of the Ta/Nb is effected, gangue is filtered off using Terylene filter cloths. (Murex were among the first commercial users of Terylene for this purpose.)

During the dissolving reaction, some hydrofluoric acid tends to escape. From each vessel a polythene pipe leads upwards to a larger polythene container filled with Raschig rings (of polythene and made by cutting polythene pipe into suitable sized rings). Any hydrofluoric acid not condensed in this way passes to the central hydrofluoric acid scrubbing tower which is filled with carbon rings. Countercurrent washing with soda ash solution is carried out. The Alkali Inspector insists on a low HF limit of 0.05 grains/cu. ft. (0.1 grains/cu. ft. of total acid expressed as SO_3).

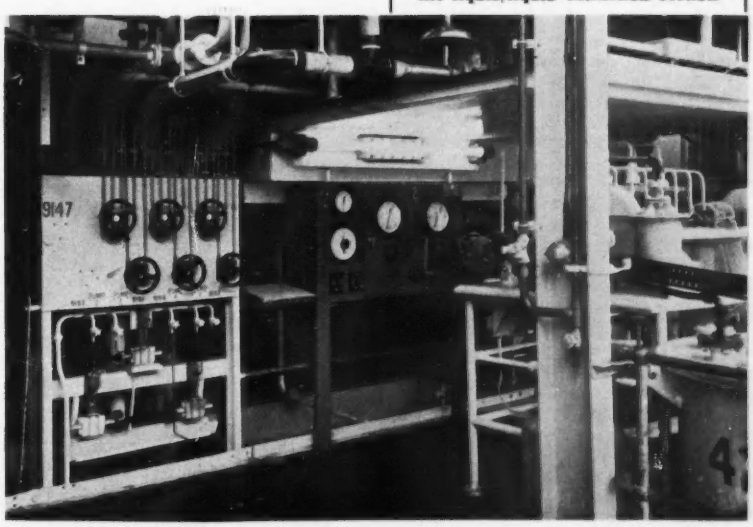
To separate tantalum and niobium from each other and from major impurities carried in the primary solutions, liquid/liquid extraction is carried out in shallow polythene tanks using methyl iso-butyl ketone. Equipment for this section is isolated from the rest of the department by a fire wall while all solvent storage is outside the building.

The mixer-settler units are of novel design, being constructed of polythene, and using air-driven stirrers in order to reduce the fire hazard. Careful control of concentrations, acidities and phase ratios (relative proportions of ketone to aqueous phases) results in a solution containing pure tantalum emerging from one side of the plant, while a pure niobium solution issues from the other side, the raffinate—which contains the impurities—being pumped to an effluent treatment plant, where all acids and soluble fluorides are removed before the liquor goes to drain.

The pure liquors are each precipitated to give potassium tantalum fluoride or potassium niobium oxyfluoride, and then recrystallised to change their form, after which they are dried and reduced with sodium. The reduction products are drilled, leached with alcohol to remove excess sodium, and then with water to remove soluble fluorides. Finally the resulting metal powders are washed with acid and acetone in turn, after which they are dried at a low temperature. The tantalum production line extends down one side of the plant, while the niobium line occupies the other side. All liquid effluent proceeds to a special treatment plant.

The principles governing the control of gaseous effluent are, first to operate in such a way that the minimum of amount of acid fume is produced (by control of reaction rates, temperatures, etc.), second to control such fume locally by devices

Fume disposal stack is constructed in Resilon



Part of the control system on the liquid/liquid extraction section

such as reflux heads, and third to pass the remaining gaseous effluent to a scrubbing system which has been deliberately overdesigned to cope with loadings greatly in excess of those anticipated.

Safety Aspects. The main building is heat-insulated and one of two air conditioning plants supplies warm filtered air to areas where pure products are being processed. Specially dried, double-filtered air is supplied where required. Safety procedures are laid down for maintenance work, clearance certificates being required before maintenance personnel can enter the plant, and decontamination certificates being demanded before maintenance work is allowed to proceed on equipment where there is a chemical or fire risk.

Devices such as catch trays below tanks containing hazardous solutions, flange-boxes on pipelines carrying dangerous liquor, high-level alarms and overflow lines on tanks, have been installed in generous numbers. Operators are supplied with good quality protective clothing, light-weight helmets incorporating a specially designed face shield, and slipper baths, showers and eye-douches are liberally provided.

High Production Rate of Plastics Materials Maintained in Third Quarter

SALES of plastics materials during the third quarter of this year were somewhat lower than in the second quarter, but stocks of materials increased, indicating that the record level of production reached in the second quarter was being maintained.

Total net sales in the third quarter at 122,000 tons were more than 24,000 tons, or 25%, higher than in the corresponding quarter in 1958. Stocks of materials increased by 4,700 tons in the third quarter whereas there had been a run-down of 2,100 tons in stocks during the second quarter of the year.

Expansion continued to be most marked in the thermoplastic field, with large increases, as compared with the previous year, in sales of polythene and polyvinyl chloride, while sales of thermosetting materials were also well above the level of the previous year.

Exports in the third quarter were not quite as high as in the record second quarter of the year, but at over 35,000 tons were almost 8,000 tons, or 28%, higher than in the corresponding period last year. Imports were again high at 14,000 tons, the same level as in the previous quarter and about 3,000 tons more than in the third quarter of 1952.

New Sales of Plastics Materials

Thousand Tons		1959	
	Year 1958 (a)	April–June	July–Sept.
THERMOSETTING MATERIALS			
Alkyds	44.7	13.0	12.4
Aminoplastics	49.9	13.2	13.2
Phenolics and cresylics	65.4	19.3	16.8
Polyesters	4.7	1.7	1.7
Other (b)	6.3	2.1	2.0
TOTAL THERMOSETTING	171.0	48.3	46.1
THERMOPLASTIC MATERIALS			
Cellulose plastics	11.6	3.0	2.9
Polyvinyl chloride (c)	73.3	24.3	21.4
Polystyrene	33.2	10.2	9.8
Polyvinyl acetate	12.1	3.8	3.0
Other (b)	114.5	38.1	38.6
TOTAL THERMOPLASTIC	244.6	79.3	75.7
TOTAL, ALL PLASTICS MATERIALS	415.6	127.6	121.8

(a) Inc. epoxide resins and casein plastics.
(b) Exc. sales of resins (i.e. polymers sold as such).
(c) Inc. acrylics, polyamides, polytetrafluorethylene, polythene, p.v.c., resins (i.e. polymers sold as such).

New-type Molecular Models for U.K.

UNITS from which molecular models, accurate in stereo characteristics, can be built up rapidly, are produced by Büchi Co. of Switzerland. Marketing the units in the U.K. are L. Light and Co. Ltd., Poyle Estate, Colnbrook, Bucks. The units consist of small rods and tubes which are soldered together at the correct angles at a point representing the atomic nucleus; the free ends represent atoms of hydrogen so that individual units represent CH_4, H_2O, NH_3, etc.

Known as Dreiding stereomodels, the models are assembled by introducing the rod of one unit into the tube of another and push-button type of mechanism holds the atoms at the correct internuclear distance (1 cm. represents 0.4Å). Without hindering the free rotation of the rods in the tubes. When two or more atoms are attached to a bond which cannot be rotated under ordinary conditions, they are represented as a single unit; the two principal nuclei are soldered together at the correct distance. A simple system of marking allows easy differentiation between isolated, conjugated and aromatic double bonds and different atomic nuclei are readily distinguished at a glance by their distructive colouring as only central axes of the bonds are shown and the electron clouds are omitted. A clear view of the geometrical relationships is given and internuclear distances can be easily measured.

Sets of units consisting of $50C^4$, 5C=C, 5C=O, 2C=C, 5C=C (conj.) 50^2, 9C=C (ar.), $5N^3$ cost £21 10s and a smaller set containing $30C^4$, 3C=C, 4C=O, 2C=O, 3C=C (conj.), 40^2, 7C=C (ar.), $2N^3$ is available price £14.

New Office Block for B.O.C.

Excavation has begun on the Hammersmith site of the new 14-storey office building, contract for which has been awarded by British Oxygen Co. to Richard Costain Ltd., 111 Westminster Bridge Road, London S.E.1.

Capital Investment in U.K. Chemical Industry

CAPITAL investment in the U.K. chemical industry from 1948 to 1958 is given by Sir William Garrett, chairman, Association of British Chemical Manufacturers, in *The Financial Times Survey of Chemicals*, published this week. These figures, quoted in £ million, are: 1948, 38.0; 1949, 53.9; 1950, 86.0; 1951, 103.0; 1952, 110.9; 1953, 112.7; 1954, 96.5; 1955, 105.5; 1956, 148.9; 1957, 170.3; 1958, 160.0.

In another article, Mr. H. W. Vallender, A.B.C.M., gives figures for the production of sulphuric acid in Europe last year. Expressed in '000 tons of 100% acid these are:

Austria	117
Belgium/Luxembourg	1,087
Denmark	184
France	1,786
Germany	2,920
Greece	106
Ireland	60
Italy	1,949
Netherlands	745
Norway	82
Portugal	271
Sweden	385
Switzerland	121
Turkey	19
U.K.	2,277
Total	12,109

Water Treatment Opportunities in Australia

ON-THE-SPOT manufacture in collaboration with Australian firms is the way to meet local competition in the sale of water-treatment equipment—to avoid customs duties and freight rates.

This was said by Mr. Michael Boby, managing director of the family firm of water-treatment engineers William Boby and Co. Ltd., of Rickmansworth, Herts, after his recent round-the-world sales and research trip, in the course of which he investigated conditions chiefly in the U.S., Canada and Australia.

In the two former-named countries Mr. Boby found that even a specialist British firm would find it hard to compete with local firms, who are "well on top of the job", though he mentioned that in electrodialysis Boby's were already established in the U.S. through their sales agreement with A.M.F.

In this context, however, it is noted that the firm are sending to Canada a senior technician 'to assist in development work on a new project in Saskatchewan' (see 'People', p. 908).

Move to Restart Work at Skye Diatomite Deposit

The Government is to be asked by Inverness County Council to seek an arrangement whereby the diatomite deposits in Skye can be again worked. Diatomite deposits were investigated in the postwar period and developed extensively by Scottish Diatomite Ltd. Work was discontinued at the site some months ago and an indication given that no further work would be done until accumulated stocks were cleared. The Council is now seeking an alternative operator to work the deposits.

Shell Chemical Engineering Dept. Opened at Cambridge

Inspecting equipment at the Shell chemical engineering laboratory are, left to right: Professor P. V. Danckwerts, Lord Godber (chairman of the Shell Group) and Professor H. Butterfield, vice-chancellor of Cambridge University

THE SHELL Chemical Engineers Studies Fund to found a school of chemical engineering at Cambridge University was opened in March 1945 with the generous sum of £435,400, and was accompanied by an offer to make an annual sum of £2,500 (later increased to £3,000) available until further notice.

Last week, on 9 December, with the opening of the fine new chemical engineering laboratories at Cambridge, that donation was well ploughed into the soil and should do a great deal toward reducing Britain's deficit of chemical technologists.

Since 1948, when the first Shell professor of chemical engineering, T. R. C. Fox, initiated teaching, 187 students have graduated in chemical engineering, and the teaching staff has grown to its present establishment of six lecturers, three demonstrators and an assistant director of research. (Two of these posts are at present vacant.) So far more than £250,000 has been spent on the laboratories, which are scheduled for final completion in 1961.

Dearth of Engineers

Lord Godber, chairman of the Shell Group, in his opening address described how during the war Shell discovered the sad dearth of chemical engineers in this country, in consequence of which reliance had to be placed on "the excellent assistance of our associated companies in Holland and Canada." This situation, said the speaker, could be disastrous if not corrected.

The department which was the result of Shell's determination to rectify the situation, is equipped for experimental research on a wide variety of subjects, including scale-up problems in fluidisation; bubbles in liquid-solid fluidised beds; loading and flooding in a packed tower. It also includes equipment for investigating small-quantity purification; tracer bubbles in a fluidised bed; bubbling and particulate fluidisation; liquid flow over packing, and sizes in a fluidised bed.

Equilibrium stills installed on the first floor are arranged to provide data on ternary systems of distillation, and the Ellis type still has recently been used for a detailed study of the system acetone-benzene-chlorobenzene. Also installed are a Swietlawski-type still and a miniature recirculation still due to Jones, Colburn and Schoenborn.

A model distillation stage is on this floor, and in this apparatus the vapour of pure benzene from the small vessel is contacted with a boiling mixture of acetone, benzene and chlorobenzene in an inner contactor tube surrounded with the boiling mixture under reflux. By analysis it is hoped to gain information about the role of condensation-evaporation mechanisms. A research project on mass transfer at liquid-liquid interfaces investigates successful techniques in the mass transfer in gas-liquid systems applied to the more difficult case of liquid-liquid systems.

Second Floor Apparatus

Apparatus on the second floor relates to solute interaction in interphase mass transfer; diffusion across interfaces, stirred and unstirred; fluid mechanics of sieve trays and other data, while the third floor is equipped for high-speed photography; wave damping by surface-active agents (to distinguish between the theories of Levich and Davies); gas absorption into stirred liquids, continuous stagewise ion exchange, and a number of other processes and problems. There also is a continuous-flow emulsifier wherein various types of emulsion are under study.

Cambridge University has founded what it claims to be the first department in this country based on the new concepts of manufacture by continuous processes in chemical engineering, and the architecture and fittings of the laboratory conform to the latest techniques, with adjustable benches, central heating through the ceiling, electronically-operated fire alarm systems and special equipment designed to localise accidental flooding. There is a total of six constant-temperature rooms, 11 combined teaching staff office research laboratories, two large combined teaching and research laboratories for chemical bench work; lecture theatre, library; and two laboratories with associated instrument laboratories, one measuring 60 ft. by 33 ft. by 17 ft., and the other 48 ft. by 45 ft. by 22 ft. There is also a drawing office and two photographic dark rooms.

It is usually the case where a fine (and expensive) conception is converted into reality, that a great deal of the drive and initiative emanates from behind the scenes, and this is reported to be no exception. Both Lord Godber and the vice-chancellor, Professor H. Butterfield who introduced him at the opening ceremony, mentioned in this connection the name of John A. Oriel, C.B.E., whose efforts combined with his reputation as advised to the Shell Group were vital in bringing the department at Cambridge into being.

British Plant for Indian Pulp Mill

CLAIMED to be the first non-integrated bamboo pulp unit in the world, a project entailing manufacture of some 100 tons of pulp a day is about to be implemented at Lamsakhang, in Assam, India.

Appointed consulting engineers for the job by Assam Pulp Mills Ltd., are Manderstam, Lowe and Partners Ltd., 38 Grosvenor Gardens, London S.W.1, who state that the pulp will be shipped in dry-sheet form to India's industrial areas.

Completely self contained, the new mill will be located in the heart of vast reserves of bamboo. But salt will have to be imported and carried to the factory over considerable distances. The mill will, however, be completely self contained, providing its own chlorine and caustic soda; and the conventional bleaching process will be adopted.

Plant and equipment costing about £4 million will be purchased, £1½ million of which will be spent in the U.K.

New B.P. Test Laboratory at Llandarcy Refinery

THE new laboratory built at a cost of some £380,000 at the B.P. Llandarcy Refinery in South Wales was officially opened recently by Dr. S. F. Birch, research associate of B.P.'s Petroleum Chemicals Department in London.

With a staff of 120, including chemists, chemical engineers, analysts and technicians, it has facilities both for routine testing of products made from the refinery, and for investigation of problems associated with refining processes. In addition to a number of laboratories there are offices, a conference room, library, sample store and accommodation for other services (Dr. Birch will be remembered for his discovery of the acod alkylation process in 1936, and the use of superfactionation in 100-octane aviation fuel production in 1941).

Rise in U.K. Chemical Production

The Index of Industrial Production (based on a 1954 average of 100) shows an index of 118 for the 'chemicals and allied industries' group in August, compared with an August 1958 figure of 102. Second-quarter 1959 index was 129 (115 in 1958).

Fisons use Monel to Overcome Corrosion Due to Fluosilicic Acid in a Rotary Filter

ONE of the basic components of compound fertilisers is superphosphate, and Fisons Ltd., as manufacturers of fertilisers and other agricultural products, make the chemical compound in large quantities from phosphate-bearing rock.

The superphosphate process involves treatment of the phosphate rock with sulphuric acid, and since the rock contains both silicon and fluorine compounds, this reaction with acid results in the evolution of gaseous silicon tetrafluoride. This gas is drawn by fan through a scrubbing tower where it is absorbed by water and a solution of fluosilicic acid at a concentration of some 25% results. Part of the fluosilicic acid produced at Fisons' fertiliser plants has been used to make potassium fluosilicate. With increased demand for this material recently, a new plant had to be built.

Fluosilicic acid is pumped from the scrubbing tower, is stored in rubber-lined tanks, filtered, and reacted with potassium chloride solution under carefully controlled conditions to produce a suspension of fine, uniform crystals, which are then filtered off, washed, dried and packed for despatch.

Problems of Choice

Several problems had to be considered in choosing a filter to recover potassium fluosilicate. Thus a compact unit which would need a minimum of attention was required. The product had to be washed completely free from impurities dissolved in the liquor, and the filter cake had to be as dry as possible, to avoid wasting heat in the drying stage. Also the liquor being handled contains fluosilicic and hydrochloric acids, resulting in severe corrosive conditions.

Fisons decided that the most suitable construction material was Monel nickel-copper alloy. Davy Paxman and Co. Ltd., Colchester, therefore built a rotary vacuum filter in which Inco's Monel, supplied by Henry Wiggins and Co. Ltd., Birmingham 16, was used for all metal parts in contact with the liquid.

The Davy Paxman filter consists of a drum divided into a number of vacuum- and pressure-tight cells which communicate with ports in an automatic valve head. The drum is covered with a fine-weave calico cloth, and rotates partially submerged in a trough of the slurry to be filtered. The slurry is agitated in the trough to prevent the heavy solid particles settling to the bottom.

Three sections in the valve head control the filtration cycle. Application of a vacuum causes the slurry to be drawn against the filtering medium; the filtrate passes into the cells and through the valve head to the filtrate receiver tank, while the solid builds up as a cake on the outside of the drum. The vacuum continues to be applied after the cells leave the filter trough in order to remove the surplus liquor. The cake then passes under a spray bar where it is washed with fresh water and again sucked dry.

Five successive washing and drying operations are performed before the cake is removed from the drum by a scraper knife, assisted by a blow-back of compressed air through the cells. The entire process is continuous.

The drum, the perforated plate and the scraper are of welded construction in Monel nickel-copper alloy, and all bolts and screws used in the filter are also of Monel. All other parts in contact with the corrosive liquors are lined with rubber, Monel being the only unprotected metal. The Fison filter has been in commission for two years and is said to have been completely satisfactory.

Fifty Readers to One Copy of 'Chemical Age'!

How many people read your copy of 'Chemical Age'? According to one subscriber who has returned the C.A. reader survey card, "about 50". Other returns indicate that each copy of this journal is read by up to 19 different persons. This reader survey card, which all subscribers will receive shortly, is designed to give accurate information on this subject and on the sections of news coverage that are of most interest. Readers are also asked to indicate any topics on which they would like broader coverage.

Main object of the survey is to help us provide the best possible news service to the chemical industry and it would be greatly appreciated if our subscribers would complete and return their cards as soon as possible. No postage is required if mailed in the U.K.

Plastics and Chemicals now Account for 8% of Royal Dutch/Shell Turnover

PLASTICS and chemical products now represent 8% of the total annual turnover of the Royal Dutch/Shell Group of companies. This is stated in the current issue of *The Shell Magazine*. Early in 1960, Shell's first synthetic rubber plant on the Continent will come into production at Pernis Refinery, near Rotterdam, with an initial capacity of 50,000 tons per year. This new plant of Shell Pernis Chemische Fabrieken N.V. will employ about 100 men on process work and an additional 300 on maintenance, cleaning, etc.

THEIR acrylic fibre, Creslan, is to be research laboratory, known as the K.S.P.L.D. laboratory, opened recently at Delft, is the newest of Shell's 16 laboratories and is one of six in Europe and the U.S. working exclusively in the field of plastics, resins and rubbers. A new plastics laboratory is also to be built at the Carrington, Manchester, plant of Shell Chemicals Co. Ltd., where work will be carried out on polystyrene, polypropylene, and both high-density and low-density polythene.

Lurgi Gas Puts Mond Plant out of Business

APPROVAL from the Ministry of Power to build the £8 million Lurgi gas plant at Coleshill, Warwickshire, will bring about a close-down of the South Staffordshire Mond gasworks, whose 'sidelines' covering a range of pharmaceuticals etc. have been handled by the West Midlands Gas Board since nationalisation.

Gas in fact was the 'sideline' when the Mond plant started up early this century, the main object being production of ammonia and other by-products, and the gas production did not come to the fore until price reductions killed the ammonia business.

Mond gas, low in calorific value, is cheaper than ordinary gas being sold at 1s 3d a therm, against 1s 4½d to 1s 7d, and the board anticipate some difficulty in persuading consumers that the new supplies will constitute cleaner and more efficient fuel.

Cyanamid to Market Acrylic Fibre in U.K.

THEIR acrylic fibre, Creslan, is to be marketed in the U.K. by American Cyanamid in the immediate future. Supplies will be imported from the U.S. and marketed by the Cyanamid of Great Britain. There are at present no plans to manufacture this fibre in the U.K., although a range of agricultural and industrial chemicals is produced in the U.K. under licence by other companies. The only U.K. Cyanamid production unit is for pharmaceuticals, for the company's Lederle Division.

U.K. producers of acrylic fibres are Courtaulds Ltd., whose present capacity is to be raised from 12 million lb./year to 22 million lb. by early 1961, and Chemstrand. E. I. du Pont de Nemours, whose acrylic fibre Orlon is imported from the U.S., are building a plant in Holland which will be on stream, also early in 1961 producing 17.5 million lb./year.

Safety in the Chemical Industry

SAFE-HANDLING PROCEDURES FOR LIQUEFIED GASES

By
'John Green'

The pseudonym 'John Green' is used by the author, an authority on the safe handling of chemicals, who has spent his working life specialising in this field. In this article he discusses some of the hazards likely to arise during the handling of gaseous elements when transported in the liquid form. He also outlines the safety procedures that should be followed

SUBSTANCES which are usually liquefied for use can be divided into two classes: 1, those in which the compound in its liquid form is usually handled and used from closed containers; and 2, those which in the liquid form can only be handled and used from vented vessels.

The criterion which governs the classification is the 'critical constants' of the substance in question. The critical temperature is that temperature above which the substance cannot be liquefied by pressure alone. The critical pressure is the pressure required to liquefy the substance at the critical temperature. It follows from this that if the temperature at which the substance is to be used is lower than the critical temperature, it may be kept in a closed vessel.

The critical constants of a few well-known elements and compounds are tabulated below, those in Class 1 above being given first:

SUBSTANCE	CRITICAL TEMP. °C.	CRITICAL PRESSURE ATM.
Acetylene	36.0	62.0
Ammonia	132.4	111.5
Carbon dioxide	31.1	73.0
Butane	153.0	36.0
Chlorine	144.0	76.1
Dichlorodifluoromethane	111.5	39.56
Propane	96.8	42.0
Steam	374.0	217.7
Hydrogen	−239.9	12.8
Oxygen	−118.8	49.7
Nitrogen	−147.1	33.5
Air	−140.7	37.2
Fluorine	−155.0	25.0

The significance of the classification given above will be clear from a consideration of the table which is derived from 'Perry's Chemical Engineers' Handbook (3rd Edn.)'.

Considering Class 1 above, there is no standard form of container for all these substances and in most cases the circumstances decide the design. For small quantities and for substances that have to be stored in the container for some time, the normal compressed gas cylinder is a firm favourite. Some of these are quite large and may hold several hundred lb. of liquid. For larger amounts, large cylindrical tanks are used, examples being chlorine and ammonia. Both these substances are transported in both forms of container. In most cases, a consideration of the vapour pressure curve of the particular substance will indicate the design requirements in respect of strength.

For most of the substances there is no serious handling problem if ordinary care is used. The containers are undoubtedly pressure vessels within the scope of the Factories Acts and normal insurance procedure and should be treated as such. In many cases they are the property of the supplier and he undertakes the necessary statutory testing and examination. It is therefore reasonable that cylinders and other containers are returned within the time laid down. This can be achieved by only ordering sufficient of the chemical as will enable this requirement to be met.

Where the container is supplied with a screw cap to cover the exit valve, this cap should always be used as its use will prevent possible corrosion of the valve spindle through atmospheric moisture. The type of fittings depend on the state in which the substance is to be used. If it is to be used as a liquid, there will either be a dip-pipe reaching to the bottom of the cylinder, otherwise the cylinder will have to be inverted. Obviously the criterion will be the weight of the cylinder.

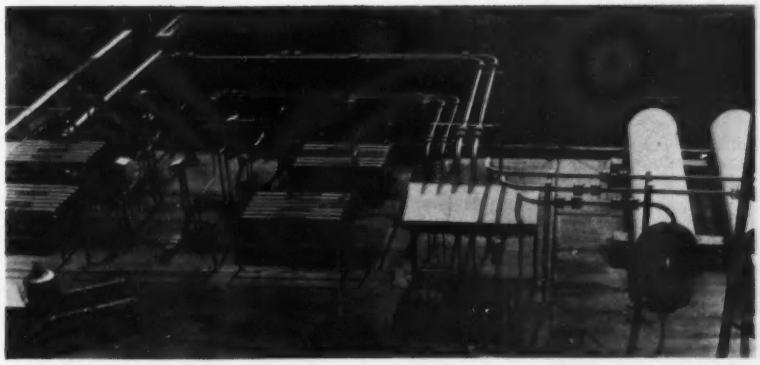
If the liquid is to be transferred into another container, as liquid, a pressure differential will be necessary in order to effect the transfer. This may be achieved by attaching the cylinder to the suction side of a pump, or by chilling and partially evacuating the receiver. The practice of heating a cylinder to produce a pressure differential is bad and should never be used under any circumstances.

In handling containers, it is often difficult to find out how much has actually been taken out of it as it is not practicable to fit gauge glasses. The easiest method is to weigh the container. The tare is usually marked on the outside to facilitate this operation. Normally containers should not be completely emptied. There should always be enough of the substance left in to provide a positive pressure. This will ensure that there is no ingress of air and moisture. These, when there is any action between the substance and either air or moisture, are a source of corrosion.

The weighing procedure suggested above becomes almost essential, notably in the case of butane and similar gases, which are used and drawn from the cylinders in small quantities for, say, laboratory use. Weighing seems the only safe way to ensure that the container does not empty and draw air into it. The difficulty lies in the fact that as the gas is consumed, more of the liquid evaporates and fills the vapour space, so that the pressure remains the same. When all the liquid has evaporated, the remaining vapour is quickly drawn off and the pressure drops very soon and with little or no warning. This can be avoided by arranging the installation so that there is always a spare container available and connected. The suppliers issue detailed instructions covering such an installation, and these should be followed.

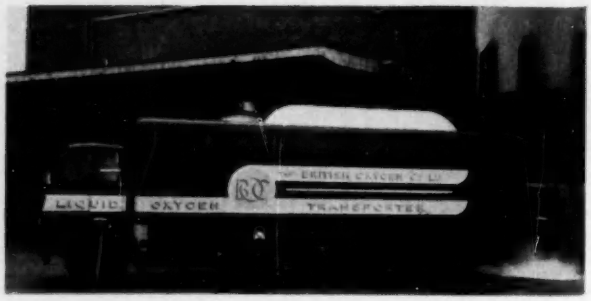
In using fuel gases of this type, it is as well to remember that the calorific value is usually higher than 'town's gas' or producer gas and so a greater proportion of primary air is needed in the burner. The burners used should be of an approved type. If a standard type of gas burner is used, the flue gases will be rich in carbon monoxide, with the usual effects associated with this gas.

Mention has been made of the bad practice of heating the containers to discharge the liquid. For the same reason, containers should not be stored in the open where they are in direct sunlight,



High pressure gaseous nitrogen installation at one of the former Ministry of Supply Establishments. By courtesy of the British Oxygen Co. Ltd.

Safety in the Chemical Industry



An 8-ton capacity liquid oxygen transporter, with 80-ton storage tank on the right. By courtesy of the British Oxygen Co. Ltd.

or be stowed at the back of the boilers. There is very little likelihood of these substances freezing under the weather conditions usually prevailing in Great Britain.

To conclude this part of the subject, one must mention that these substances are often both toxic and inflammable and so the usual precautions need to be taken when opening containers and in using the gases. These should need no reiteration here for they have been published many times elsewhere.

The handling of liquefied permanent gases presents certain hazards but these can easily be avoided if reasonable care is exercised, and the basic facts are clearly understood. These gases are at a very low temperature and if the liquid comes into contact with the skin a freeze-burn may result. These burns can be very painful and often are sufficiently serious to be regarded as third degree burns, and they are especially serious if they affect the eyes. Protective clothing and goggles should be designed with this aspect in mind.

When dealing with oxygen, oils and greases should be absent, and the same rule applies in the case of fluorine. Another danger which is directly due to the low temperature of the liquid is the presence of water. Any equipment in use which is not kept absolutely dry may ice-up when the liquid enters. This applies universaliy, and in particular to valves. Naturaliy, this icing will occur after the valve has been opened and then it may not be possible to shut it. This means that the valve will fail to danger rather than safety. The same principle applies to some extent to the presence of impurities in the gas itself. When the gas is actually liquefied, these impurities may solidify and the solids clog up fine nozzles. Suppliers of these gases are usually alive to this point and provide products of a high standard of purity in order to minimise this risk.

Liquefied gases with a low critical temperature are usually stored and handled in vessels which have to be vented and, as the vent is in the nature of a safety valve, it is always slightly open. The vessels are specially constructed and insulated to reduce heat transfer, and hence loss by evaporation, to a minimum. This design is now so good that evaporation losses on permanent gases can be as low as 10% per annum.

Liquefied gases behave generally as liquids and so if the pressure in the space over the liquid is increased, the boiling point is also increased. This means that by adjusting the setting of the vent valve to give a higher pressure the loss by evaporation may be reduced. This is a procedure which should not be adopted in a light-hearted manner, as the design of the vessel for use under such circumstances is a job requiring both experience and knowledge. There are many pitfalls for the unwary.

This continual venting, although only slight, brings its own problem on the safety side. If the vessel is in an enclosed space, this space will gradually build up an increased concentration of the gas involved. In the case of oxygen there is an enhanced risk from fire. Cases are on record of greasy overalls igniting spontaneously in atmospheres containing 26% of oxygen. It does not require extensive leakage to produce such an atmosphere. In the same way, an excess of nitrogen may produce an atmosphere which in the limit becomes suffocating.

In the case of liquid air, the ordinary rules governing fractionation of liquid mixtures will apply and the composition of the vapour coming off will be different to that of the liquid. Ammonia has the property of dissolving metallic copper, and so copper must not be used in the making of equipment for use with ammonia. Hydrogen presents certain problems, the most important being the very wide range of its explosive limits. It is necessary to arrange for the vent from a hydrogen storage vessel to discharge to open air so that the chance of an explosive mixture being generated is reduced to the absolute minimum.

This short article has endeavoured to point out the hazards in connection with the use of liquefied gases which are the result of the state in which the gas exists. No mention has been made of the general dangers that may accompany the use of any particular chemical because of its composition, e.g., hydrocyanic acid. These dangers will also be present and will need the usual care to prevent accidents.

'Chemical Age' Survey of New Safety Equipment and Apparatus

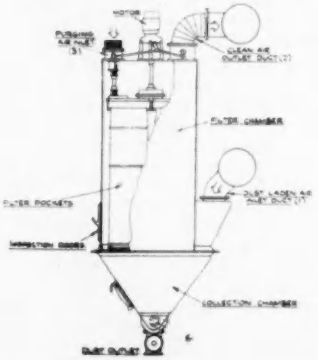
SALA PERSONAL SAFETY BLOCK NOW AVAILABLE in England, the Sala personal safety block is a device for providing security to operators in high places. It consists of a 16 ft. steel-wire rope, spring-loaded, controlled by a braking device; quickly fitted, it has a locked hook for simple attachment to the workman's safety belt. The man has complete freedom of movement though the rope remains taut; and in the event of a fall the brake operates and he is brought to a stop within one foot, and supported.

The equipment is exhibited at the Safety Health and Welfare Centre of H.M. Inspectorate of Factories, London S.W.1, and every block is supplied with a test certificate from a 'recognised English testing house'. Further particulars from **Neldco Processes Ltd.**, Crossway House, Bracknell, Berks.

ELECTRONIC EXPLOSIVE-GAS DETECTOR A NEW device which is sensitive to all inflammable gases, the **I.E.C.-Sieger Ltd.** equipment requires no adjustment for coal or bottled gas, or for chemical vapour. It is spray and waterproof, operative in humid conditions, with detector head located in the danger zone, and embodies a dual alarm at the control point—both audible and visual. A green light indicates when the system is on duty, and alarms continue while gas concentration persists.

The instrument, "designed to give instant warning of danger even after years of non-indication", embodies catalysts impregnated in an insulating material which is heated by wire coils, part of a balanced circuit. Electrical unbalance caused by a gas is amplified by a transistor in a feed-back circuit operating a relay in the alarm system. Electrical contacts, housed in spray and corrosion-proof box, are protected from effects of corrosive atmospheres. The firm's address is 39 Parliament Street, London S.W.1.

AUTOMATIC DUST FILTER FROM GERMANY DUST FILTERING apparatus embodying automatic shaking gear is now available from **Keith Blackman Ltd.**, Mill Mead



Dust filtering apparatus

Road, London. This equipment is being made by the firm in collaboration with the German company of Otto Hubbe, under licence from the Fischer automatic dust filter manufacturer. It is made in two basic types, one of square section containing 24 rectangular filter pockets, the other of circular section with 27 circular filter sleeves.

While in operation a special high-frequency vibrating mechanism agitates the pockets in the horizontal plane to dislodge the dust particles from the filter bags, and life of the material is not shortened by the stresses involved in the concertina-type of shaking operation. The shaking gear is self-contained in dust-tight cast iron enclosures, and there is said to be no danger of moving parts being affected by dusty conditions.

PREVENTION OF EYE ACCIDENTS

THE OCCUPATIONAL eye safety division of the **Hadley Co. Ltd.**, Portsmouth Road, Surbiton, Surrey, has available an exhibition panel specially arranged to

Hadley exhibition panel

attract attention to equipment for prevention of accidents to the eye. The panel shows a number of damaged safety spectacles from interested customers of the firm who have provided reports describing incidents in which the Hadley safety spectacles averted accidents.

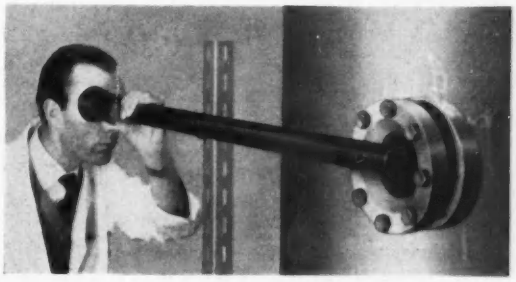
PAKAWA SAFETY BELT

PROVISION of belts and harness that can be worn all day without discomfort has been the aim of **Barrow, Hepburn and Gale Ltd.**, Grange Mills Road, London S.E.1, whose Pakawa lightweight belts are described as applicable to chemical works where there are strong acid concentrations. Here the Terylene variety are recommended, of the 'Surelok' type, in an all-weather construction of Terylene web with p.v.c. coating and single-action 'snap-to' locking safety buckle.

Two other types complete the range: the 'Wiry', of conventional design

Safety in the Chemical Industry

Allen A.201 safety periscope for safe visual inspections



made from flax webbing with eyelets protected by internal wire cords set in leather liners for strength and flexibility; and the 'Gripper', of new pattern endless nylon web belting of a design said to give perfect comfort and security by simply pulling the webbing tight either side of the two-way buckle.

Available together with a series of anchoring attachments, straps, ropes and lines, the equipment can be rapidly converted to the needs of linesmen, spidermen, window cleaners or builders, or to make bosun's chairs or lifting appliances. The equipment, said to have been exhaustively tested, comes with the 'kite mark' in accordance with B.S. specification B.97/1956.

LABORATORY GERM FILTER/CLEANER

DEVELOPED by **Cimex-Fraser Tuson Ltd.**, of Orpington, Kent, a combined vacuum sweeping and polishing device which filters off the germs from the laboratory floor was recently demonstrated in London.

Originally designed for use at the Aldermaston Atomic Weapons Research Establishment, where it has been used to pick up dust containing radioactive particles, it is said to mark an important advance by eliminating dissemination of germs and other noxious substances.

SAFETY PERISCOPE FOR INDUSTRY

A SAFETY periscope has been added to the **P. W. Allen and Co.** range of remote and direct viewing equipment for visual inspection and observation in industry and research.

The periscope, Allen type A.201, is for use by observers when closely viewing equipment and processes through sight glasses in pressure vessels, furnaces, chemical plants, etc., who are in danger of serious injury in the event of window breakage. A 90° eye piece is available for use when the instrument has to be held horizontally at a lower level than that of the eye, and low voltage high-density spot lights are also supplied to fit the periscope for such uses as viewing inside pressure vessels which are without internal lighting. Further details can be had from the firm at 253 Liverpool Road, London N.1.

Hazards in Non-Ferrous Foundries

KNOWN and potential health hazards in non-ferrous founding are dealt with in the second report of the joint Standing Committee on Safety, Health and Welfare Conditions in Non-Ferrous Foundries, published by the Ministry of Labour (H.M.S.O., price 1s 9d net).

A medical appendix is included in the report covering both known and potential risks, and the committee comment that "a good knowledge of this part would result in the avoidance of many risks which might be introduced inadvertently with new processes".

Zinc Fumes. Metal fume fever (zinc ague) is less common than it was, but still occurs when yellow brasses are cast if fumes are not controlled.

Beryllium Toxicity. No case of beryllium poisoning has been known to have occurred in foundries in the U.K. Certain compounds of beryllium are toxic. Wherever beryllium fumes are produced, there is a risk of poisoning and it has been tentatively suggested, the sub-committee report, that levels above 2.0 microgrammes per cubic metre of inhaled air give risk of chronic poisoning. For all practical purposes, the report states, these figures mean that beryllium fumes must be completely suppressed. The necessity for the highest possible standard of control if beryllium is used, is stressed.

Dangers of Cadmium. Reddish fumes of cadmium oxide, which are given off when alloys containing cadmium are cast are extremely irritating to the lungs and may cause severe damage and even death. There is also a chronic form of cadmium poisoning.

Selenium and Tellurium. While these elements are not often used in foundries, tellurium has been used in small quantities and some copper base alloys also contain it.

The elements themselves are considered to be relatively non-toxic, as are the selenides and tellurides of copper and other common non-ferrous metals, but both elements do give some highly toxic inorganic compounds. Throat irritation has been reported and operators handling these substances often develop an unpleasant 'garlicky' odour of the breath. The metals should, therefore, be treated with some care and fumes from them should not be allowed to pollute the atmosphere.

Safety in the Chemical Industry

Bad Accident Record is Due to Inefficient Management

MANAGEMENT of every company must make it its determination to operate a safe factory, declared Lord Kirkwood, a director of British Titan Products Ltd. when he opened a 'Safe Way for Industry' exhibition in the Cleveland Scientific and Technical Institution on 23 November, to mark the National Industrial Safety Week. This was a two-day exhibition and it was also held at the Cleveland Bridge and Engineering Co., Darlington, on 27 November.

Lord Kirkwood was deputising for Mr. G. H. Beeby, chairman of the company, who was absent through ill-health. He said that a bad accident record should be regarded as inefficient management in the same way as would be poor production or uneconomic use of plant or materials. Workers must also play their part by thinking and working the safe way and by using the protective clothing and devices provided.

Lord Kirkwood pointed out that the annual report of the Chief Inspector of Factories showed that during 1958 167,000 workers were victims of industrial accidents which led to an absence from work of three days or more; if the under-three-days accidents were added, the total exceeded 200,000 accidents a year, which was far too high. In spite of the efforts of local industry, Tees-side was unfortunately one of the accident black spots.

J. Deverell, division safety officer, I.C.I. Billingham Division (left) with Lord Kirkwood, director of British Titan Products, and S. G. Tinsley, technical director of B.T.P., at the 'Safe Way for Industry' exhibition

Mr. T. C. Robinson of I.C.I., chairman of the Tees-side Industrial Accident Prevention Committee which sponsored the exhibition, said it was an attempt to bring safe working ideas to more people in a different way. The safety record of local firms had improved immensely since the committee was set up and it was hoped that the contributions of member-firms to the exhibition would lead to an even higher standard of safety.

Most of the suggestions shown arose from shop floor discussion. Many industrial hazards were not very obvious except to the men on the job and their interest was all important declared Mr. Robinson.

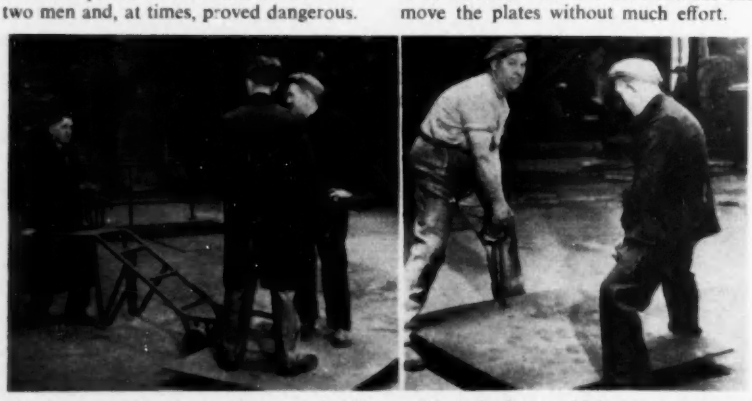
After the opening, which was attended by more than 200 representatives of top management from all large Tees-side firms, the exhibition was seen by a constant stream of visitors, many works sending parties of apprentices, members of safety committees and other work people.

Ardeer Lifting Idea is Safer, Cuts 'Sweat and Toil'

THE recent National Industrial Safety Week, from 23 to 30 November, ber, focused attention on the importance of finding methods of easing and reducing the efforts of workers, thereby increasing their working efficiency.

One such labour-saving idea has been introduced at a plant operated by the I.C.I. Nobel Division, at Ardeer, Ayrshire. Beneath the floor of the plant run conveyor trenches, which are covered by mild-steel plates, roughly three feet square, and weighing 1¼ cwt. The lifting of these plates was a difficult task for two men and, at times, proved dangerous. Not only were strained muscles a possibility, but the plates were so unwieldy when man-handled that there was always a risk of them being dropped.

The problem was examined by physiotherapy department of Nobel Division. Now, a safer, quicker and easier method of lifting the plates has been devised with the help of a specially designed barrow with extended shafts and forks. The plates are lifted by engaging the forks of the barrow with the rings specially fitted into the plate. The barrow is so balanced that one man can lift and move the plates without much effort.



This labour-saving and safe way of lifting mild-steel plates which cover conveyor trenches at Ardeer (left) replaced the difficult manual job shown on the right

Explosion Risk in Metal Powders

THE processing of certain metallic powders, such as aluminium and magnesium, has been responsible for many destructive explosions and safeguards against their worst effects have been the subject of much attention among the industries and authorities concerned.

The recently published F.P.A. technical information sheet *Aluminium and Magnesium Powder Grinding and Blowing and the Explosion Risk*, is mainly concerned with the prevention of explosion.

It emphasises the necessity of isolating and enclosing powder grinding processes in blastproof cubicles, provided with explosion vents. Information on the building of such structures is given and the installation of adequate ventilation, pressure relief and electrical equipment is dealt with in detail. Various safeguards (aimed at increasing the general safety) such as the wearing of flameproof clothing by workers engaged in the process and the regular cleaning of premises to prevent accumulation of dust are also recommended.

A copy can be obtained free of charge on request to the Fire Protection Association, 31/45, Gresham Street, London E.C.2.

I.C.I. Polythene Plant Works to Flowsheet Rates

No. 4 polythene plant at I.C.I.'s Wilton Works has been successfully completed and handed over to the Plastics Division. Design of the plant had just started when the control of polythene production was transferred from the Alkali Division to Plastics Division two years ago.

In working out their programmes, Alkali Division engineers were faced with problems of changing conditions and depleted staff because of transfers. They fixed two target dates for completion of the plant, May and October this year. The western half of the unit was handed over in May and the eastern half in October. The plant is now working to flowsheet rates.

Overseas News

U.S., FRENCH AND SWISS COMPANIES LICENSED FOR JAP CELLULOSIC FIBRE

NOW being produced in various countries are cellulosic fibres belonging to a class which has been called the polynosics. One of the best fibres of this type, is stated to be Toromomen developed in Japan by Tachikawa Laboratories Ltd. Licences to manufacture the fibre under the name Z-54 have been granted to Cie Industrielle de Textiles Artificiels et Synthétique (C.T.A.) and the Swiss company, Société Chimiatex. In turn the Hartford Fibres Co., division of Bigelow-Sanford Carpet Co. Inc., U.S., have been licensed to market the fibre in the U.S. under the name Zantrel. Supplies are to be imported from Europe at first but Hartford Fibres expect to be in production by next summer.

Z-54, is said to have a remarkably homogeneous structure which facilitates even dyeing, while absence of a non-permeable skin on the fibre makes dyeing easier. The fibre has a round cross-section which improves crease-resistant qualities. Other properties of the fibre are that it has high tensile resistance, a high modulus of elasticity, high elastic recovery and low water absorbency. In the wet state, when the fibre has been moisture-conditioned it is reported to behave like cotton, but with greatly increased resistance to deformation under weak stresses indicating that garments made from polynosic yarn would have unusually high dimensional stability during washing. Low absorbency of the new fibre presents swelling when the fabric is wet and allows much more rapid drying compared with a cotton fabric of comparable construction.

Chemical finishing agents have been found to have no harmful effect on the fibres' characteristics or performance. Resin treatment, it is reported, further improves the wash and wear characteristic of a polynosic fabric and also due to the low absorption rate, repeated washings do not impair the fabric. Tear strength of polynosic yarns is claimed to be superior to that of other rayon fibres.

The new fibre has blended well with natural and synthetic fibres. No dyeing problems are created when it is blended with cotton as the dye affinities of the two fibres are similar.

Gulf Oil's Role in U.S. Chemical Industry

With the opening of the new benzole plant by the Gulf Oil Corporation, of Pittsburgh, at Port Arthur, Texas, only a fortnight before benzole output from steelworks coke ovens in the country ceased with the steel strike, the entire production of the Gulf plant—30 million U.S. gall. of benzole, plus quantities of allied products—has found immediate markets. Gulf Oil are to play a yet bigger part in America's chemical industry when they open a petrochemical plant they are at present erecting near Philadelphia at a cost of $40 million.

Costa Rica Projects Fertiliser Plant

Local interest has recently been aroused by news of a proposal to build a fertiliser plant in Costa Rica, financed by parties in the U.S., West Germany and the Central American Republics.

A report states that the plant would cost some $7 million (U.S.) and produce 440 tons daily; it would be largely capitalised by Compania Financeria Agricola Industrial S.A., a Costa Rican entity, and the remaining capital, some 40%, would come from the foreign group.

Plans have also been announced for a synthetic textiles factory whose products will be manufactured from imported raw materials. Estimated cost of this project is around $130,000.

U.K. Backs Cellulose Plant for Portugal

A cellulose plant, reportedly to be erected with U.K. backing, is to be built at the mouth of the River Sado south of Setubal on the Mitrena Peninsula. Government permission for the plant is expected to be granted before the new year.

Hercules Powder Expand Chemical Output in U.S.

One of America's leading specialist chemical producers, the Hercules Powder Co. of Philadelphia, have plans for a large expansion programme for their plant at Hercules, in California. In the future quantities of 8 million U.S. gall. of methanol, 50 million lb. of formaldehyde and 11,000 short tons of urea formaldehyde are to be produced there annually.

Utilisation of Alanno Methane

The plants of Bussi Officine are being modernised, and when the work is completed will utilise natural gas produced near Alanno, Province of Pescara, by wells drilled by the Montecatini affiliate Petrosud. The gas will provide both fuel and raw material in production of chloromethanes.

U.S. Aid for South Korean Chemical Industry

The U.S. Development Loan Fund is to grant credit of $5,600,000 to the Oriental Chemical Co., of South Korea, for the construction of a soda factory. Applications for loans from South Korea at present lodged with the Fund in Washington but not yet finalised include requests for credits of $9,600,000 for a rayon plant, $1,700,000 for a polyvinyl chloride unit, of $2,370,000 for a chemical salts plant and of $750,000 for a thorium plant. Further credits from the U.S. to South Korea $170 million for the financing of current imports of raw materials, synthetic fertilisers and consumer goods, and a special amount of $28,300,000 for future imports of synthetic fertilisers.

Extracting Vinyl Chloride from Alcohol and Chlorine

The Sriram Institute for Industrial Research, Delhi, has developed a process for extracting vinyl chloride from alcohol and chlorine. The technical know-how for chlorination of vinyl chloride to trichlorethane has also been developed.

At present India's requirements of p.v.c. resins are met by imports that last year amounted to 15,000 tons. Some additional 60 tons of vinyl chloride monomer were also imported. The Indian Government has already licensed four units for the production of p.v.c. resins. One of these, with a capacity of 2,880 tons per year, is expected to start production by 1961.

Budapest Perlon Expansion Talks

The Komplex Trading Co. of Budapest are conducting negotiations with an East German fim with a view to large-scale expansion of a factory for Perlon manufacture recently put into operation at Nyergesujfalu, Hungary.

U.S. Firm to Make Antidust

National Polychemicals Inc., of Wilmington, Mass., are manufacturing Antidust, a detackifier for rubber previously imported in limited quantities from Germany. The material is a product of Rhein-Chemie GmbH, Mannheim, Germany.

New Phosphate Plant for Israel

Shortly to be opened in the Arava Valley in Israel is a new phosphate plant, reports Barclays Bank D.C.O. from its Jerusalem office. Surveys have shown that the valley can provide about 100,000 tons of phosphates annually.

Israel phosphate exports from the old Dead Sea plant will total 100,000 tons and will bring in $800,000 during the current fiscal year, adds the Bank report.

Canadian Chemical Production Figures

Production of hydrochloric acid in Canada in January-September this year increased to some 31,159,000 lb. from 26,914,845 lb. a year earlier, sulphuric acid to 1,197,902 tons (1,134,891), chlorine to 208,771 tons (196,866), mixed fertilisers to 567,658 tons (509,689), and caustic soda to 246,997 tons (227,066). Nine-month output of ammonium sulphate fell to 244,465 tons (255,027).

September production of hydrochloric acid rose to 3,455,247 lb. (2,281,768),

chlorine to 23,564 tons (23,258) and caustic soda to 27,743 tons (27,169). Month's output of sulphuric acid declined to 124,417 tons (128,538), ammonium sulphate to 25,531 tons (27,727), and mixed fertilisers to 52,055 tons (53,095).

SunOlin to Manufacture Ethylene

SunOlin Chemical Co., North Claymont, Del., will construct new plant worth $15 million, and the expansion plans include manufacture of ethylene to an ultimate capacity of some 200,000,000 lb./year, a portion of which will be converted to ethylene oxide to meet developing needs on the East Coast.

Deutsche Dow Chemie Set-up in Germany

The new German subsidiary of Dow Chemical International Ltd., Deutsche Dow Chemie GmbH, will provide German operators of oil and gas wells with acidising, fracturing and cementing services, and it is assumed that the principal office of the service organisation will be situated in Hanover.

Sales of Dow chemicals and plastics in Germany will continue to be handled by Otto Krahn, general sales representative, with offices in Hamburg, Düsseldorf, Hanover, Frankfurt and Munich.

Vancouver a Good Site for Polyolefin Plant

The British Columbia Research Council reports that Vancouver would be a good site for a combined polythene and polypropylene plant, both from the viewpoint of raw material supply and access to export markets in the Far East. Indicative of the potential markets, figures are quoted as follows: Canadian polythene exports totalled $6,460,000 in 1957; $4,400,000 in 1958. U.S. exports of the material for this year are expected to be worth $93 million.

The report mentions the strong competition such industry would face, but adds that the plant could prove very profitable especially if part of the Japanese market could be assured through participation of Japanese principals in the financial operation.

U.S. Monsanto Plan Chemical Plant in Common Market

Plans to build a plant within the European Common Market to make polyvinyl butyral plastics sheet have been announced by Monsanto Chemical Co., U.S. The plant is scheduled to be in operation by late 1960 or early 1961. The site chosen has yet to be announced.

Colgate Enter Ethical Drugs Field

Arrangements are being completed for the Colgate-Palmolive Co. to acquire Lakeside Laboratories Inc., in exchange for Colgate stock. If completed, the transaction will result in issue of about 1¼ shares of Colgate for each share of Lakeside stock now outstanding.

Lakeside's facilities are considered outstanding in the field, and a major share of present sales is represented by 10 speciality products, nine of which were developed in the company's own laboratories during the past seven years. Total sales in 1958 were over $6 million; and the total sum involved in the proposed transfer involves some $13 million at current market price of Colgate stock.

National Distillers to Push Polythene Sales in Europe

To handle foreign sales of their U.S.-produced polythene, National Distillers and Chemical have formed a wholly-owned subsidiary in Switzerland. Particular markets where polythene sales are to be pushed are Great Britain and the Continent. A strong technical service programme is planned by U.S. Industrial Chemicals Division of National Distillers, who will soon start building a technical service laboratory. Shipments will be made partly from European warehouses.

Pilot Plant Ready for Marketing

Pilot plant production of polybutene-1, reported to be ready for marketing in the immediate future, shows that costs of production would be about the same as for polythene plastics. This was stated recently by the American Chemical Society in a paper presented at a regional meeting, based on research carried out with the aid of Petro-Fax Chemical Corporation, Houston, Texas. In some cases, the report goes on, the polybutene may be even cheaper to produce than polythene since greater amounts of carbon-black can be used without loss of desirable qualities.

Joint U.S.-Israeli Exploitation of Desalinising Process

A joint Israel-American company has been formed in Israel to exploit the Zarchin process for desalinising sea water, and hopes have been expressed that the process, described by the American partner Fairbanks Whitney as a 'scientific breakthrough,' will eventually be employed in the arid regions of the U.S.

Little technical data has been released about the process, said to have been invented by Dr. Alexander Zarchin while resident in Russia, but it is based on the continuous freezing and subsequent melting of sea water to free it from salt. Since only a pilot plant has so far been in operation the economics of the system are not yet fully known.

$2.6 Million Chlorine Plant for Canada

Consolidated Mining and Smelting Co., controlled by Canadian Pacific Railways, will start construction this month at Trail, British Columbia, of a $2.6 million caustic soda-chlorine plant.

Eli Lilly's New Antibiotic

A new antibiotic, bearing the name of Tylosin, has been developed by the Eli Lilly Research Laboratories, U.S. The antibiotic, based on a new streptomyces group—*Streptomyces fradiae*, from Siam—is said to have a high degree of effectiveness even at low concentrations. It is intended for use against certain harmful organisms and a group of micro-organisms including pleuropneumonia. Used on pigs and poultry, the antibiotic is reported to have the effect of making them grow.

Sulphur Dioxide as Catalyst

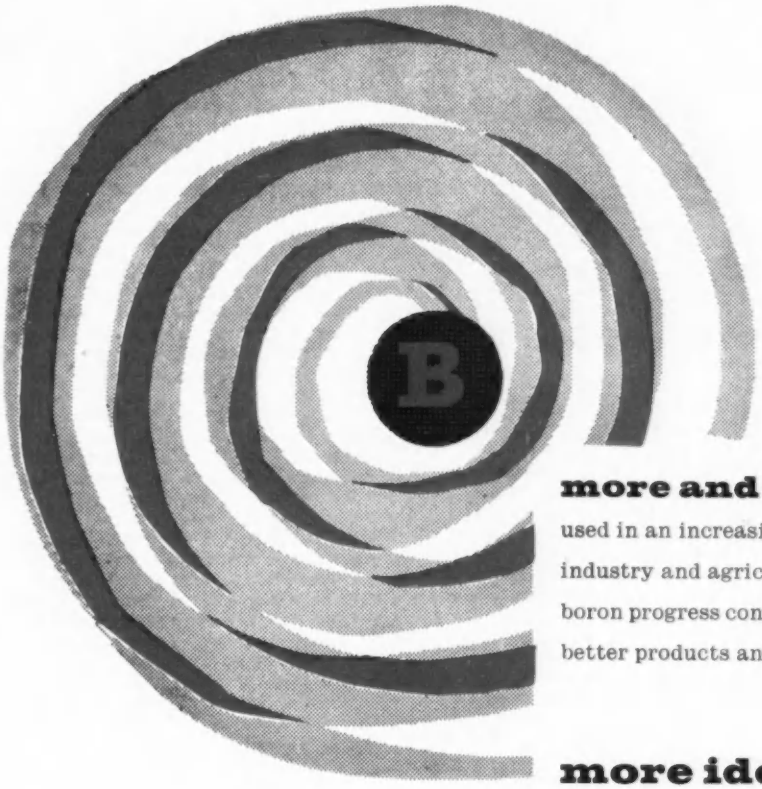
According to the U.S. chemical firm Eastman Kodak Co., sulphur dioxide is suitable for use as an oxidation medium in the catalytic vapour-phase oxidation (with V_2O_5 and Al_2O_3) of alkyl benzoles. Sulphur dioxide, formerly used as an inhibitor to halt local over-heating in the catalyst bed, is said to be an excellent oxidation medium when in mixture with such substances as toluol (at 410°C). By-products are negligible.

New Process for Du Pont Acrylonitrile Plant

CONSTRUCTION has started on E. I. du Pont de Nemours' second acrylonitrile plant at Beaumont, Texas, scheduled to be on stream by spring 1961. The classical acrylonitrile processing procedures will not be employed. Unlike Du Pont's first plant now under construction at Memphis, Tennessee, it will use the hydrogen cyanide-acetylene route, but at the Beaumont plant, acrylonitrile will be produced from polypropylene and nitric oxide, using a new patented process.

It is reported that Du Pont's new acrylonitrile process does not involve the reaction of ammonia and propylene. Ammonia is used solely as the most economical source of nitric oxide. A one-step vapour-phase nitrosation of propylene by nitric acid is carried out in the presence of a dehydrogenation catalyst (e.g. silver on silica) at 850-950°F. The Du Pont process therefore differs from that of Sohio Chemical's ammonia-propylene acrylonitrile process (CHEMICAL AGE, 7 March, 1959, p. 407). In that process a one-step conversion of ammonia and propylene to acrylonitrile is carried out by catalytic air oxidation at 550-1,000°F.

According to Du Pont their latest process offers advantages over the HCN-acetylene route such as lower cost starting materials, and simplified operation because of a reduced number of processing stages. The older process, Du Pont admit, enjoys a history of successful full-scale operation. The new process will have to match the latter process before the company will make a decision of the comparative value of the two processes.



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PEOPLE in the news

● **Dr. Edward Lee, Ph.D., M.Sc.,** has been appointed director of Stations and Industry Divisions at the H.Q. of the Department of Scientific and Industrial Research, and will take up his new duties on 1 January. **Dr. George MacFarlane, Dr. Ing.,** deputy chief scientific officer at the Royal Radar Establishment, Malvern, will succeed Dr. Lee as deputy director of the National Physical Laboratory.

● **Mr. Alec Wilson Clark,** managing director of Beatson, Clark and Co. Ltd., glass-bottle manufacturers of Rotherham and Stairfoot, Yorks, has been elected president of the Glass Manufacturers' Federation. Until his election Mr. Wilson Clark was chairman of the federation's council. Among his various appointments, he is also vice-chairman of the British Glass Industry Research Association. **Mr I. B. Throndsen** has been elected chairman of the council of the G.M.F. to succeed Mr. Wilson Clark. Mr. Throndsen is managing director of Johnsen and Jorgensen (Trident) Ltd., and past president of the British Lampblown Scientific Glassware Manufacturers' Association.

● **Mr. H. H. Richardson** has left Shell Chemical Co. after a long period of service, to take up an appointment with R. S. Waddington Ltd. He has been detergents sales manager, Southern sales region, since 1957, and is succeeded by **Mr. D. H. Miller,** formerly commercial section head of Detergents Department in head office. Mr. Miller joined the company after war service in the R.A.F. where he was a Flight Lieutenant and was awarded the D.F.C. His post is taken over by **Mr. N. Goodwin,** previously detergents sales representative in Midland sales region.

Mr. J. W. Armstrong, who has joined Styrene Co-Polymers, Sale, Cheshire, to develop sales of the firm's new range of Scopacron thermosetting acrylic resins

● **Mr. P. A. Jackson,** a senior technician of William Boby and Co. Ltd., will shortly embark for Canada to assist in development work on a new project in Sasketchewan.

● **Mr. G. S. Taylor,** who has been co-opted to the board of Gas Purification and Chemical Co. Ltd., is chairman and managing director of Grundig (Great Britain) Ltd., a subsidiary company.

● **Mr. L. A. Elgood,** chairman of the United Glass Co. Ltd., has been appointed chairman of the newly formed Committee on Natural Resources in Scotland which in the new year will survey Scottish primary resources. Members, with their special responsibilities, include: **Dr. A. F. Woodward,** director, Arthur D. Little Research Institute, Inveresk (general procedure); **Dr. A. B. Stewart,** director, Macaulay Institute for Soil Research, Aberdeen (land); **Professor W. Frazer,** Department of Mechanical, Civil and Chemical Engineering, Royal College of Science, Glasgow (water); **Mr. R. H. S. Robertson,** consultant in raw material development, Pitlochry (minerals); **Dr. B. Raistrick,** research director, Scottish Agricultural Industries Ltd., Edinburgh (development).

● **Dr. H. Powell** has recently been appointed section head of the analytical section, Petroleum Division, of the British Petroleum Research Centre in succession to **Mr. W. H. Thomas.** Joining the firm on the developments staff at Llandarcy in 1938, Dr. Powell transferred to the Sunbury Research Centre in 1941 and took control of the spectroscopic group in 1948.

● **Dr. D. W. Davison, F.Inst.P., F.I.M.,** has been transferred to the central personnel executive staff at the head office of The Plessey Co. Ltd., Ilford, to assist the personnel director with scientific and technical appointments throughout the company and its associates.

● **Sir Walter Worboys,** a former director of I.C.I., is the Federation of British Industries' nominee for the new Export Publicity Council convoked by the President of the Board of Trade, Mr. Maudling, under the chairmanship of the Minister of State. Sir Walter has now joined the board of the Mercantile Credit Co. Ltd.

● The following members have been elected to fill vacancies on the council of the Plessey Co. Ltd., Ilford, to assist from the annual general meeting on 29 March 1960: As president, **Sir Ronald Prain, O.B.E., Hon. M.I.M.M.,** chairman and president, Rhodesian Selection Trust, Ltd.; as vice-presidents: **H. M. Finniston, B.Sc., Ph.D., A.R.T.C., F.I.M.,** research manager, C. A. Parsons and Sons, Ltd.; **H. W. Hignett, B.Sc. (Eng.), F.R.I.C., F.I.M., M.I.W.,** assistant managing director, Henry Wiggin and Co Ltd.; as ordinary members of council: **R. W. K. Honeycombe, M.Sc., Ph.D.,** professor of physical metallurgy, University of Sheffield; **Ivor Jenkins, D.Sc., F.I.M.,** chief metallurgist, Research Laboratories, the General Electric Co. Ltd.; **E. Robson,** managing director, the Manganese Bronze and Brass Co. Ltd.; **J. Salter, B.Sc. (Tech.), A.M.I.E.E.,** director, the British Aluminium Co. Ltd.; **C. Smith, F.I.M.,** works director, James Booth and Co. Ltd.

● Under a reconstitution of the boards of the four subsidiary companies of Edgar Allen and Co. Ltd., Imperial Steel Works, Sheffield 9, the following new appointments were recently instituted: to the board of the British 'Rema' Manufacturing Co. Ltd., of Sheffield—**Mr. J. P. Lewis, Mr. W. G. A. Jenkins, Mr. J. Higginbottom**; to the board of Buell (1952) Ltd., London—**Mr. W. J. McBride, Mr. F. A. Ross**; to that of J. H. Humphreys and Sons Ltd., Oldham, Lancs—**Mr. G. W. Turton, Mr. F. Haig, Mr. W. C. Garrison;** and to the board of the Park View Steel Works Ltd., Sheffield—**Mr. F. Haig, Mr. G. C. Longden, Mr. W. H. Everard, Mr. L. F. Keeley.**

● **Dr. D. S. Urich** has been appointed lecturer in chemistry at the University of Birmingham; **Dr. C. G. Wall** becomes lecturer in chemical engineering; **M. B. H. Hayes, B.Agr.Sc., M.Sc.,** and **Dr. J. P. Simons** are appointed I.C.I. Fellows in chemistry; and **D. W. Thomas, B.Sc.,** becomes N.C.B. Research Fellow in physical chemistry.

Addition to Shell's Cariflex Rubber Range

A RESIN/RUBBER master batch has been added to their Cariflex range of synthetic rubbers by Shell Chemical Co. Ltd. The new product, Cariflex FP-103, consists of equal parts of high styrene resin (styrene butadiene 85/15), low Mooney viscosity (30-38) rubber of the F-1509 type. The combined styrene content of the master batch is approximately 54%.

Cariflex FP-103 is light in colour, non-discolouring, non-staining and is suggested as a convenient source of predispersed resin for microcellular and sponge soling, flooring compositions and hand rubber products. The presence of the low Mooney cold rubber facilities the uniform incorporation of FP-103 in compounds of these types.

New Standard for Pentachlorophenol

BASED on a draft specification of the Ministry of Defence, the new publication, British Standard for Pentachlorophenol (B.S. 3175, 1959), specifies requirements for the form, purity, crystallising point, matter insoluble in sodium hydroxide solution and total acidity of technical grade pentachlorophenol. The material specified is used for imparting resistance to microbiological attack to materials such as wood and textiles. Copies may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London W.1, price 3s.

Commercial News

- **£1½ Million Profit for Distillers Co. Ltd.**
- **Powell Duffryn's Acquisition of Pipeweld**
- **20% Rise in Turnover for Bayer AG.**
- **Increase in Capital for A. Gallenkamp**

The Distillers Co. Ltd.

Group profit of The Distillers Co. Ltd. for half-year ended 30 September 1959, after depreciation, is estimated at £14,686,000 (£12,841,000). Income from trade investments amounted to £430,000 (£738,000) and after interest on debenture and loan stocks of £335,000 (£354,000) and eliminating the interests of outside shareholders £269,000 (£193,000), the net profit before taxation is £14,512,000 (£13,032,000).

During the second half of the current year trading results continue favourable, but the freer supplies of Scotch whisky have undoubtedly influenced the seasonal pattern of demand in the home market, making the present position more difficult to assses, although the year's results should be satisfactory.

An interim dividend on ordinary for the year ending 31 March 1960 has been declared at 5% (4% equivalent), payable on 26 February. This increase in the interim implements the proposal in the chairman's statement accompanying the last annual accounts.

Head Wrightson

Head Wrightson and Co. have declared an interim dividend of 4% (compared with equivalent of 3½% after allowing for scrip issue).

Powell Duffryn Acquire Pipeweld

Powell Duffryn Engineering Co. Ltd. have acquired the whole of the share capital of Pipeweld Ltd., of Paston Road, Wythenshawe, Manchester 22. The latter firm have for many years undertaken all forms of pipework including installations at oil refineries and at oil, chemical and gas plants as well as long distance pipelines, jacketed and terminal pipework and jetty pipework. Their facilities include complete pipe fabrication, i.e. bends, headers, heat exchangers, and the company is able to undertake work on customer's material carrying out site work on contract or daywork basis.

This combines with Powell Duffryn Engineering's experience in all forms of tankage and enables P.D.E. to undertake as an integrated project comprehensive installations involving storage tanks and vessels, associated pipework and long distance pipelines.

Farbenfabriken Bayer

Farbenfabriken Bayer AG have indicated that contrary to early expectations 1959 will prove to have been an exceptionally good year for the firm. Including the results of subsidiaries, turnover of the Bayer concern for the year is estimated as DM 2,400 million, or over £200 million; some 20% more than last year. This is in the face of an all-round drop in Bayer prices of 2.5% over the year, resulting in a loss of DM 60 million —or £5 million—profit. Exports will prove to have been over the DM 1,000 million (£83 million) level for the year, export turnover having risen more quickly than home sales and now making up 43% (42%) of all sales. Particular successes were in the sales of the synthetic fibre Dralon, which were three times those for 1958, in plant protection media and in plastics, turnover in which rose by 30% over the year. Total investment in the coming year should be approximately that for 1959—DM 300 million—of which about five-sixths went for home investments. An increase of capital to meet investment is anticipated for 1960, this increase probably to be decided upon in mid-May.

Acetorgan/Montecatini

The Barcelona Acetorgan concern have raised their share capital to 90 million pesetas (some £530,000), and the United States subsidiary of the Italian-based Montecatini group, Novamount Corporation, have taken over half of the company's shares. Apart from this buying-in, the American Montecatini company have granted Acetorgan a credit of $1 million, to be paid back over the next 10 years (CHEMICAL AGE, 5 Dec., p. 818).

Pfizer AG

The 36th subsidiary of the U.S. Pfizer concern was founded on 1 December in Zurich, Switzerland, under the name of Pfizer AG and with an initial capital of Sw.Fr.100,000, or £8,340. Pfizer now have subsidiaries in every country of the two major European trade blocs except Norway and Luxembourg. As well as manufacturing, the Swiss subsidiary is to carry out laboratory work. Directors are Mr. R. Fenton (Britain), Dr. von Caspelberg (Switzerland) and Dr. Ludwig (Switzerland)—also the company's manager.

Etabl. Kuhlmann

French chemical manufacturers, Etablissements Kuhlmann, are to call a special meeting next month to approve an increase in capital by 25,000 million old francs. The increase, if approved, would be effected by the cash subscription of new shares of 10,000 old francs each at a premium of 5,000 old francs, on a two-for-five basis. The board also proposes to make a one-for-five scrip issue.

INCREASE OF CAPITAL

A. GALLENKAMP AND CO. LTD., Technico House, Sun Street, London E.C.2. Increased by £85,000 beyond registered capital of £115,000.

C. W. FIELD LTD., Edwards Lane, Speke, Liverpool, 24. Increased by £125,000 beyond registered capital of £25,000.

Market Reports

PRICE INCREASES FOR ZINC OXIDE

LONDON The industrial chemicals market has followed a steady course with contract delivery specifications covering good quantities. New inquiry on home account has come from most of the user industries, and the tendency is for buyers to cover their requirements for some months ahead. Export trade has again been satisfactory.

Zinc oxide prices are higher with the Red Seal being quoted at £109 10s 0d per ton as from 14 December. Lithopone 28/30% is £2 per ton dearer at £57 10s per ton for quantities of 5 tons or more. A further advance in the price of copper sulphate has been announced, the current quotation being £80 10s 0d per ton, less 2% f.o.b. Liverpool.

The call for agricultural chemicals is seasonally quiet, but a good demand persists for basic slag.

There has been little change in the coal tar products market and business has been reported to be steady.

MANCHESTER In the Manchester market for chemical products traders are taking a reasonably cheerful view of prospects over the first half of the coming year and sellers are carrying a good average volume of contracts for forward delivery. The outlook for shipping business is also regarded favourably. Meanwhile, movement of supplies on both home and export accounts has been maintained at a satisfactory level in most sections, though the usual year-end quietness is now in sight.

SCOTLAND The volume of activity has been very well maintained during the past week in the Scottish heavy chemical market, and demands are still covering a full and varied range of industrial chemicals. Activity has also been quite brisk in regard to enquiries for contract requirements for the coming year, and in this connection quantities are being reasonably upheld. On the whole the level of prices has been more or less steady. On overseas markets again the position has been satisfactory with the usual steady flow of varied enquiries received.

TRADE NOTES

Plasticisers Prices Reduced

Reductions of between £7 and £10 a ton for six of their Reomol range of plasticisers have been announced by the Geigy Co. Ltd., Rhodes, Middleton, Manchester. The reductions are reported to be a result of the lower prices of normal butyl, iso-decyl and 2-ethylhexyl alcohols. The Reomols affected are DEP, DiDP, DOP, DOA, DOS and DBS.

Rubber Latex Preservation

A technical service bulletin, No. 18, has been issued by Borax Consolidated Ltd., Borax House, Carlisle Place, London S.W.1, describing uses of boric acid in rubber latex preservation.

New Phone Number

The telephone number of Winkworth Machinery Ltd., 65 High Street, Staines, Middlesex, has been changed to Staines 55951/3.

New H.Q. for Reed Packaging

Reed House, the new headquarters of the Reed paper group's packaging division at Kew Bridge, Brentford, Middlesex, has now been occupied, bringing together for the first time all the group's companies with interests in the packaging field. These are Reed Corrugated Cases Ltd., Reed Cartons Ltd., and Medway Sacks Ltd.

Gas Scrubbers Brochure

A 12-page brochure describing venturi gas scrubbers for industry is available from Chemical Construction (G.B.) Ltd., 9 Henrietta Place, London W.1.

Finishes for Aluminium

A leaflet describing 'Ladadize,' a 'tough, decorative range of epoxy-based lacquer finishes for aluminium which compare favourably with electro-chemical processes' is available from Swale Chemicals Ltd., 53 Park Hill Road, Croydon, Surrey.

Answer to Dust Problems

Efficiency of 99% is guaranteed for their Multi-Wash system for collection of dust or fume in the form of a sludge or liquid effluent by W. C. Holmes and Co. Ltd., Gas Cleaning Division, P.O. Box B7, Turnbridge, Huddersfield. The firm's Holmes-Schneible system is described and illustrated in a coloured brochure.

I.C.I. Solvent Prices

'Initial reductions' of £1 10s per ton in the price of trichloroethylene and £5 per ton in that of perchloroethylene are being introduced by Imperial Chemical Industries Ltd. on 1 January. (See p. 893).

Reinforcing Concrete Floors

A new product called 'Hexweb' is claimed to be proving successful for reinforcing concrete floors where they are subjected to much wear from heavy-duty trucking, etc. Manufactured by Causeway Reinforcements Ltd., Five Ash Works, Dover Road East, Northfleet, Kent, the material is a 'webbed, chilled cast-iron floor grid, chemically toughened'.

Creep Deformation May be Unimportant

FURTHER developments in the work of the National Engineering Laboratory at East Kilbride are announced in the 1st annual report of the Mechanical Engineering Research Board, published by H.M.S.O., price 4s 6d (4s 11d by post). Among the subjects contained in the report is 'Creep to fracture under complex stresses,' wherein it is stated that a limited amount of deformation may not matter in pressure vessels, steam pipes and similar structures as long as fracture does not take place.

The laboratory's DEUCE computer is being used to prepare new international tables for steam, covering temperatures up to 800°C and pressures up to 1,000 atmospheres.

H.M.S.O. Directory Explains Factory Inspectorate

A new publication, *H.M. Factory Inspectorate Directory*, published by H.M.S.O. price 3s net, provides a comprehensive reference book for those seeking information about matters which come within the jurisdiction of the Factory Inspectorate. The publication arises from the reorganising and renaming of the Divisions, which came into force in March, 1958.

Chemical Courses Announced for Early 1960

A SHORT course of lectures on problems of radioactivity at water and sewage works is announced by the Manchester College of Science and Technology, Manchester 1, for 14 and 15 January.

New techniques in high polymer chemistry are the subject of a special short course to be held at the Bradford Institute of Technology on 26 and 27 February. This will include isotopic methods; relaxation spectra, and mechanico-chemical reactions of polymers.

A post-graduate lecture course on 'Newer developments in the chemistry of non-metals' is to be held at the Kingston Technical College, Fasset Road, Kingston-upon-Thames. Starting 27 January, it covers organic compounds of boron; condensed phosphates; organic polymers of phosphorous; phosphonitrilic chlorides and their derivatives; organo-silicon compounds and polymers; and inorganic chemistry of fluorine.

A short course, 'An introduction to micro- and semi-micro chemical methods' will start on 9 January at the Norwood Technical College, London S.E.27.

A course on 'River pollution, sewage disposal and trade waste effluent' is to be held at Birmingham University in co-operation with the Institute of Sewage Purification, from 4 to 8 January, 1960, and continued from 4 to 8 April.

A.E.A.'s £100,000 Stock of Protactinium

U.K. ATOMIC ENERGY AUTHORITY'S stock of protactinium is valued at £100,000 and may well amount to the bulk of the world's stock of this material.

Announcing this, U.K.A.E.A. state that hitherto the element has not been prepared in any great amounts because of difficulties in separating it from uranium ores in which it occurs in minute quantities. Protactinium has therefore great scientific and technical interest.

Some 100 grammes of the element have been separated by the Authority from nearly 60 tons of wastes occurring in uranium production.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 3 February

Fatty condensation products. Unilever Ltd. [Cognate applications 28 589.] **827 361**

Cocoa-butter substitutes. Unilever Ltd. [Cognate application 25 623.] **827 172**

Removing hydrogen sulphide from gases. Gas Council. **827 151**

Semi-conductor devices. General Electric Co. **827 068**

Ion-exchange processes and apparatus. Permutit Co. Ltd. **827 284**

Polyethylene compositions. Distillers Co. Ltd. **827 363**

Machinery of titanium and such of its alloys as are capable of hardening upon absorption of or reaction with certain gases. Ministry of Supply. **827 364**

Polymerisation process. Distillers Co. Ltd. [Cognate applications 3 894, 14 019.] **827 461, 827 462, 827 463 & 827 464**

Production of conjugated polyolefin hydrocarbon polymers and copolymers. Goodrich-Gulf Chemicals Inc. **827 365**

Organo-peroxy compounds. Davies, A. G., and Buncel, E. **827 366**

Production of curable polysulphide compositions. Products Research Co. **827 478**

Upgrading petroleum naphtha distillates. California Research Corp. **827 367**

Producing gaseous products of partial combustion of a hydrocarbon oil. Texaco Development Corp. **827 474**

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